

TECHNOLOGY

REVIEW *January* 1952



technology review

Published by MIT

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Some of the
chemicals being processed in
VULCAN-built Plants & Equipment:

ALCOHOLS

Methanol — synthetic
Methanol — from wood distillation
Ethanol — industrial grades from molasses and grain
Ethanol — from sulfite waste liquor
Ethanol — anhydrous, Vulcan process
Ethyl Alcohol — beverage, neutral spirits
Isopropanol Allyl alcohol
Butanol

ESTERS

Methyl acetate
Ethyl acetate
Butyl acetate
Vinyl acetate
Dibutyl phthalate

ALDEHYDES

Acetaldehyde
Butyraldehyde
Furfural

ETHERS

Ethyl ether
Isopropyl ether

GLYCOLS

Ethylene glycol
Butylene glycol

DDT

KETONES

Acetone
Methyl ethyl ketone

**CHLORINATED
HYDROCARBONS**

Chloroethane
Chlorobenzenes
Chlorotoluenes

ACIDS

Formic acid Acetic acid — from wood distillation
Acetic acid — from process residues
and solvent recovery Stearic acid
Acetic acid Propionic acid Butyric acid

HYDROCARBONS

Butadiene Toluene
Heptane Styrene
Benzene Diphenyl

PHENOLS

Phenol
Naphthol

MISCELLANEOUS

Citronellal Essential oils
Cottonseed oil Cellulose derivatives
Geraniol

VULCAN • CINCINNATI

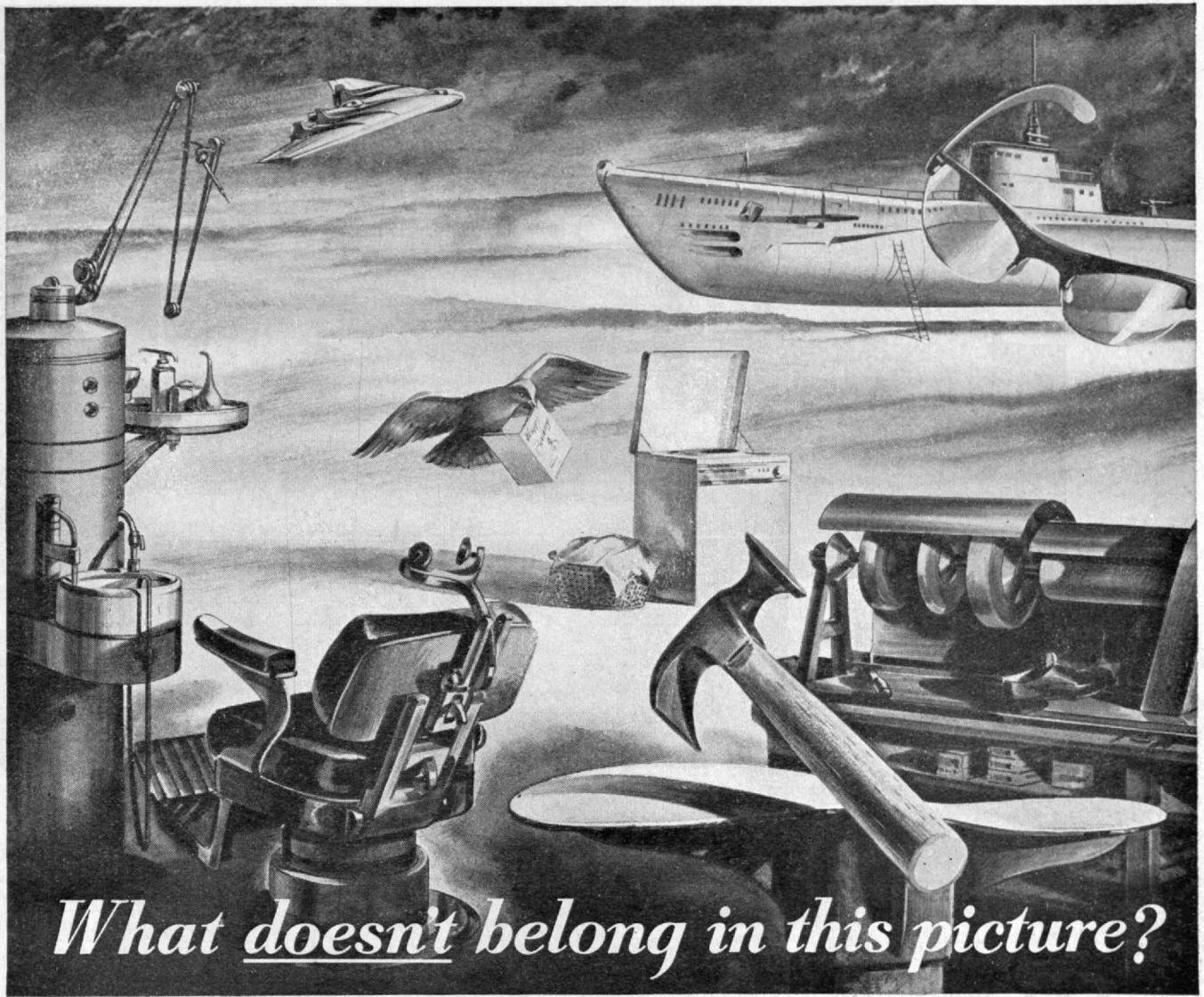
ENGINEERS AND MANUFACTURERS OF PROCESS PLANTS AND EQUIPMENT

The VULCAN COPPER & SUPPLY CO., General Offices and Plant, CINCINNATI 2, OHIO

PHILADELPHIA BOSTON SAN FRANCISCO BUENOS AIRES
VICKERS VULCAN PROCESS ENGINEERING CO., LTD., MONTREAL, CANADA

50th Anniversary

1901 1951



What doesn't belong in this picture?

All but one of the objects in this picture have something in common. They were affected directly or indirectly by the kind of products Norton and Behr-Manning make. *Can you find the stranger?*

The Shoe Repair Equipment? No! Many operations in a shoe repair shop depend on Norton and Behr-Manning abrasive products. Behr-Manning coated abrasives, for instance, are used to shape and finish heels and soles.

The Submarine? No! Hundreds of its parts depend on Norton or Behr-Manning products. Its camshafts are just one of the many diesel motor parts precision ground by Norton grinding machines and abrasive wheels.

The Greeting Card? No! Norton or Behr-Manning abrasive products are vitally important in manufactur-

ing both paper and printing presses.

Neither Is It the flying wing, the eyeglasses, the washing machine, nor the dentist's equipment.

The stranger in the picture is the bird, which does not rely on man-made products. Remember, any man-made product . . . whether of metal, wood, paper, cloth, leather, ceramics, or plastics . . . depends on abrasives, abrasive products, refractories, or grinding machines that bear such well-known trade-marks as Norton and Behr-Manning . . . world's largest manufacturers of abrasives and abrasive products.



Making better products to make other products better



NORTON COMPANY

MAIN OFFICE AND WORKS
WORCESTER 6, MASSACHUSETTS

ABRASIVES • GRINDING WHEELS • REFRACTORIES
NORBIDE GRAIN AND MOLDED PRODUCTS
GRINDING AND LAPPING MACHINES • NON-SLIP FLOORS

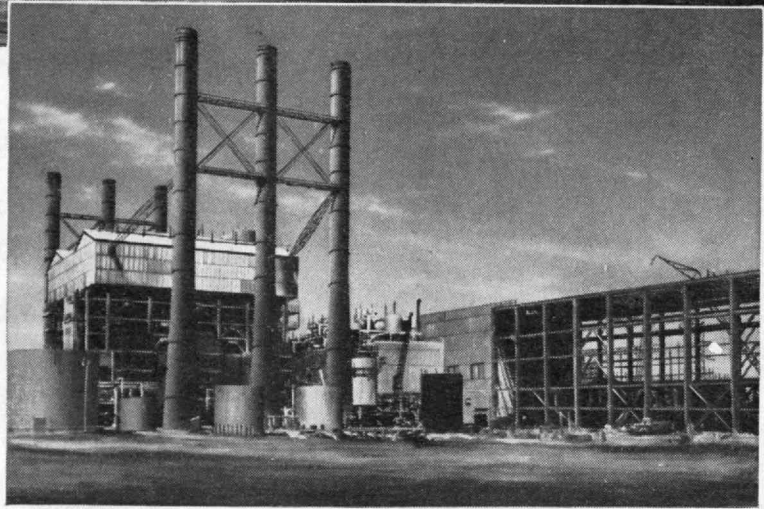
BEHR-MANNING

DIVISION OF NORTON COMPANY
TROY, NEW YORK

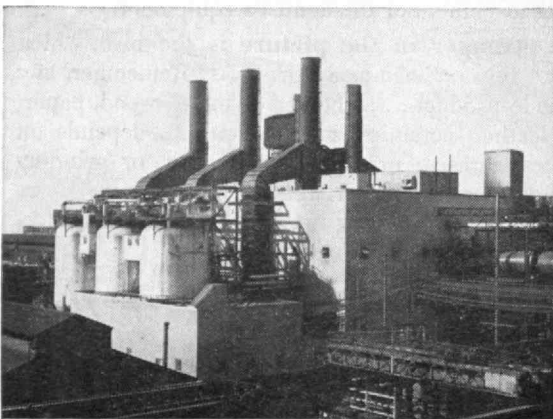
ABRASIVE PAPER AND CLOTH • OILSTONES
ABRASIVE SPECIALTIES
BEHR-CAT BRAND PRESSURE-SENSITIVE TAPES



Steam Station at Moss Landing, California, designed and being constructed for Pacific Gas and Electric Company.



WHEN INDUSTRY NEEDS POWER



Central Boiler House and Water Treating Plant for National Tube Division, United States Steel Company

The experience of Stone & Webster Engineering Corporation is available to utilities or industries requiring facilities for steam or electric generation. The work of the Corporation in the steam power station field aggregates in excess of 8,800,000 kw in capacity, equivalent to about 16% of the utility steam generating capacity in the United States.



STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY of STONE & WEBSTER, INC.



GODFREY L. CABOT, INC. produces the greatest quantity and widest range of grades of carbon black of any single producer in the world. Cabot plants extend from Texas, New Mexico, Oklahoma and Louisiana as far as Liverpool, England.

Millions of pounds of Cabot blacks are used each year in the manufacture of paint, varnish, lacquer, plastics and paper products, and for miscellaneous purposes in still other fields of industry.

Perhaps carbon in some form could do or be made to do a certain job for you. Why not write or call **GODFREY L. CABOT, INC.**

77 FRANKLIN ST. BOSTON 10, MASS.



SOME PROPERTIES TYPICAL OF CABOT CARBON BLACKS

BRAND	Principal Use	Surface Area M ² /gm*	Particle Diameter †(Milli- microns)	Nigrometer Scale (The lower the (blackier)	Volatile Matter %	Grit % Max. (325 Mesh)	Acetone Extract % Max.	Oil Absorption Lbs./100 Lbs. Black	Tinting Strength % of Sterling S	DPG Adsorption (.001N DPG Solution)	pH Aqueous Sludge	Bulk Density Lbs./cu. ft.
CARBOLAC 1	Point	1000	10	58	17	.07	0.0	160	155		2.5	5
CARBOLAC 2	Point	715	14	64	12	.07	0.0	135	155		3.5	6
CARBOLAC 46	Point	660	14	65	14	.07	0.0	125	155		3.5	6
SUPERCARBOVAR	Point	400	15	69	5.0	.07	0.0	110	170		5.0	8
MONARCH 71	Point, Plastics	380	16	71	5	.07	0.0	100	170	60	5.0	10
MONARCH 74	Plastics	300	17	74	5	.07	0.0	95	185	59	5.0	11
SPHERON C	Rubber	230	23	78	4.5	.05	0.0	82		43	4.5	22
ELF 1	Paper	145	24	81	5	.05	0.0	85	184	40	5.0	14
ELF 2	Ink	145	24	81	5	.05	0.0	85	184	40	5.0	11
ELF 3	Ink	145	24	81	5	.05	0.0	85	184	40	5.0	10
SPHERON 4	Rubber	130	24	82	4.5	.05	0.0	80	180	40	4.5	22
SPHERON 6	Rubber	115	25	83	5.0	.05	0.0	80	165	35	4.5	22
ELF 4	Ink	120	26	83	5	.05	0.0	80	180	35	5.0	14
ELF 5	Ink	120	26	83	5	.05	0.0	80	180	35	5.0	11
MONARCH 81	Paint	140	26	81	5	.07	0.0	85	184	45	5.0	12
VULCAN 3	Rubber	65	27	90	0.60	.05	0.15	117	175		9.0	22
ELF 0	Ink	160	29	80	8	.07	0.0	85	180	55	4.5	11
ELF 6	Ink	100	29	85	5	.05	0.0	75	172	32	5.0	14
ELF 7	Ink	100	29	85	5	.05	0.0	75	172	32	5.0	11
ELF 8	Ink	100	29	85	5	.05	0.0	75	172	32	5.0	12
SPHERON 9	Rubber	100	29	85	5.2	.05	0.0	80	160	32	4.5	22
MOGUL SPECIAL	Ink	350	30	80	12	.05	0.0	85	168		4.0	12
MOGUL	Ink	340	32	81	12	.05	0.2	85	165		4.0	12
MOGUL A	Ink	300	34	84	12	.05	0.2	85	165		4.0	12
STERLING 99	Ink	75	39	93	0.90	.05	0.02	70	150		9.5	26
STERLING 10 FLUFFY	Paint	40	41	94	0.8	.03	0.25	115	120		9.0	11
STERLING 50	Rubber	40	41	95	0.80	.05	0.25	136	120		9.0	22
STERLING L	Rubber	34	60	95	0.80	.05	0.2	75	120		9.5	26
STERLING S	Rubber	22	80	100	0.80	.05	0.2	65	100		9.5	26
STERLING NS	Rubber	24	80	98	0.80	.05	0.05	70	110		9.5	26
STERLING V	Rubber	27	51	96	0.70	.05	0.20	98	93		9.1	25

And
our
NEW

✓ CHECK WITH RAYTHEON for Special Purpose TUBES

- | | |
|---|---|
| <input type="checkbox"/> Aircraft Control | <input type="checkbox"/> Hearing Aid |
| <input type="checkbox"/> Electrometer and GM | <input type="checkbox"/> Long Life Industrial |
| <input type="checkbox"/> Germanium Diodes and Triodes | <input type="checkbox"/> Ruggedized |
| <input type="checkbox"/> Guided Missile | <input type="checkbox"/> Special Purpose |
| <input type="checkbox"/> Subminiatures of all kinds | |

Raytheon has designed and produced millions of such tubes — has the specialized technical skill and resources to meet your needs. Over half a million Raytheon Subminiatures are carried in stock. Over 300 Raytheon Special Purpose Tube Distributors are ready to serve you. Application engineering service at Newton, Chicago and Los Angeles.

RAYTHEON

RAYTHEON MANUFACTURING COMPANY

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Special Tube Section

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PLAN WITH DIEFENDORF . . .

On your most difficult gearing problems — let Diefendorf work out your production plans. Competent engineers to analyze every gear requirement. Gears of all types, materials and sizes. Made to specification only.

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CORP.**

Syracuse, N. Y.

DIEFENDORF
G E A R S

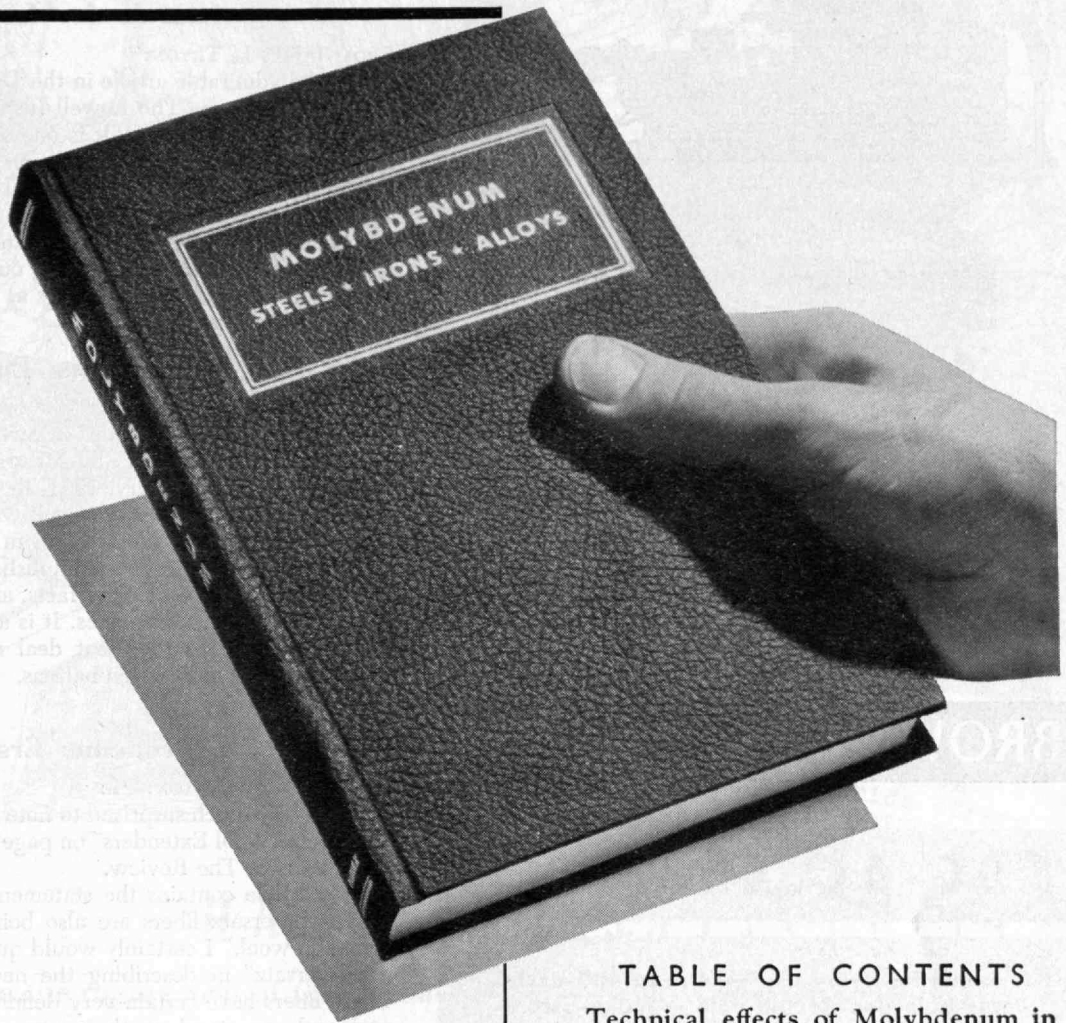
THE TABULAR VIEW .

Versatile Windmills. — In principle, at least, helicopters may be traced back to the notebooks of Leonardo da Vinci, but it has been only about a decade that these whirling windmills have assumed practical importance and significance. Its extreme versatility accounts, in large measure, for the rapid rise in popularity of the helicopter, as pointed out by L. WELCH POGUE (page 137) in the first of a two-part article on "The Significance of the Helicopter." Dr. Pogue received the A.B. degree from the University of Nebraska in 1924, the LL.B. degree from the University of Michigan Law School in 1926, and the S.J.D. degree from Harvard Law School in 1927. Following approximately 10 years of general law practice, Dr. Pogue became associated with the Civil Aeronautics Authority, and has since maintained his interests in aviation. Since June, 1946, he has been a member of the firm of Pogue and Neal in Washington, D.C.

Ore Beneficiation. — By artificially inducing radioactivity in minerals and employing the nuclear properties of the elements as a basis for automatic selection, PROFESSOR ANTOINE M. GAUDIN, WILFRED L. FREYBERGER, '47, both of the Department of Metallurgy, and FRANK E. SENFTLE of the Division of Industrial Cooperation at M.I.T., propose (page 143) a new method of ore concentration in "Beneficiation of Ores." ¶ Professor Gaudin received his bachelor's degree from the University of Paris in 1917 and immediately entered Columbia University from which he received the degree of engineer of mines in 1921. He taught at Columbia from 1924 to 1926 and for the next three years was associate professor of metallurgical research at the University of Utah. In 1929 he went to the Montana School of Mines, and, in 1939, came to M.I.T. as Richards professor of mineral engineering. He is author of numerous technical articles and of two books. ¶ Dr. Senftle, a native of Buffalo, received the Ph.D. degree in geophysics from the University of Toronto in 1947. He has been engaged in research in the Metallurgy Department at M.I.T. until recently. He is now in Washington with the Geodetic Survey. ¶ Mr. Freyberger, a native of Newark, N.J., received the S.B. degree from M.I.T. in 1947, and since his graduation has been engaged in research in mineral engineering in projects supported by the Atomic Energy Commission.

Sound and Light. — Among the more powerful aids to research in communication and linguistics are methods for analyzing and synthesizing sound by means of visible speech films. A brief description of a sound analyzer and synthesizer for speech films is given (page 145) by FRIEDRICH VILBIG. Born on April 24, 1903, Dr. Vilbig received his master's and doctor's degrees from the Technical University in Munich. He is author of approximately 50 technical papers, in addition to *Lehrbuch der Hochfrequenztechnik*. Since 1948 he has worked at the Cambridge Air Force Research Center on speech and communication problems.

For metallurgist and engineer . . .



This 400pp. book describes the varied applications of Molybdenum as an alloying element in a wide range of materials. It presents the fundamentals which must guide the selection of the most suitable alloys for specific applications.

Much recent information is included, some of it hard to find elsewhere. About 500 references to technical literature facilitate further reading, and there are 187 diagrams and 91 tables.

The book is available free on request by metallurgical and engineering students.

Climax Molybdenum Company
500 Fifth Avenue • New York City

TABLE OF CONTENTS

Technical effects of Molybdenum in Steel, Cast Steel, Cast Iron.
Fundamental Effects of Heat Treatment on Microstructure.
Addition of Molybdenum.
Wrought Alloy Engineering Steels—Medium, Low, High Carbons; Low Temperature Properties, Machinability.
Wrought Corrosion Resistant Steels.
Wrought Steels for Elevated Temperature Service.
Tool Steels. Steel Castings. Cast Iron.
Special Purpose and Nonferrous Alloys.

Please send me "Molybdenum: Steels, Irons, Alloys".

NAME.....

STATUS.....

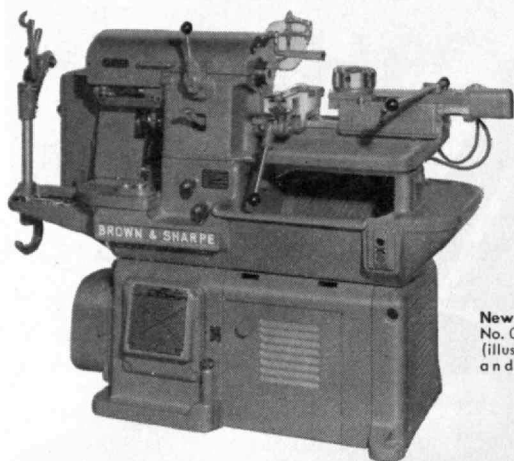
ADDRESS.....

MOLY

C 16

TR.1

Here's top efficiency for short-run jobs!



New models:
No. 00, No. 0
(illustrated),
and No. 2

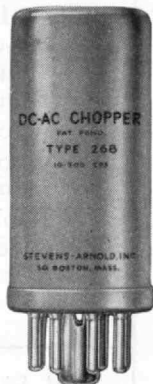
Three new-design Brown & Sharpe Hand Screw Machines do basically the same type of work as their equivalent model numbers in the automatics. But, on short-run jobs, *they do it more efficiently!* They're set up more rapidly . . . require no cams or timing for automatic functions. Designed with advanced efficiency features throughout, including full anti-friction-bearing spindles. Write for detailed literature. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

BROWN & SHARPE

DC-AC CHOPPER

**A model for every use — 60 and 400 cycles
Single pole and double pole — Make-before-
break contacts — Contacts in air or in liquid**

These Choppers convert low level DC into pulsating DC or AC, so that servo-mechanism error voltages and the output of thermocouples and strain gauges may be amplified by means of an AC rather than a DC amplifier. They are hermetically sealed, precision vibrators having special features which contribute to long life and low noise level.



WRITE FOR CATALOGS . .
#246B, 60 cycles, AC
#280, 400 cycles, AC



STEVENS-ARNOLD INCORPORATED

22 ELKINS STREET, SOUTH BOSTON 27, MASS.

MAIL RETURNS

Laurels for Lowell

FROM JAMES L. TRYON:

For the admirable article in the December, 1951, issue of The Review on "The Lowell Institute School," I want to send my appreciations. It is one of the most informing and interesting articles on education I have ever read.

The School has been a wonderful benefit to ambitious and industrious men. It was original in its conception and has been fortunate both in its trustees and its directors, who have co-operated in carrying out the intention of its founder and added to its offerings as time has gone on. Medford 55, Mass.

Engineers as Envoys

FROM LLOYD F. HUNT:

After traveling many miles in Sweden, I read with interest "Study in Sweden" by Messrs. Hill, Randall, and Schotland in the February, 1951, Review.

"Study in Sweden" is very well written and represents conditions just as we found them in Sweden. I am satisfied that if peace is to be accomplished it will be done by our engineers, as they look at facts, and facts are common in all countries and languages. It is a very important part of this goal to have a great deal more interchange of engineering talent between nations.

Los Angeles 53, Calif.

Erroneous Ersatz

FROM ERB N. DITTON, '22:

I was very much surprised to note certain statements in the article "Wool Extenders" on page 13 of the November, 1951, issue of The Review.

This article contains the statement, "To an increasing extent the ersatz fibers are also being used as blending agents in wool." I certainly would question the use of the word "ersatz" in describing the newer synthetic fibers. These fibers have certain very definite properties of their own and can stand on their own merits. They may be used as wool substitutes in certain cases, or as the article states, be blended with wool, and are certainly not ersatz fibers.

New York 16, N.Y.



Goodyear Tire & Rubber Co.

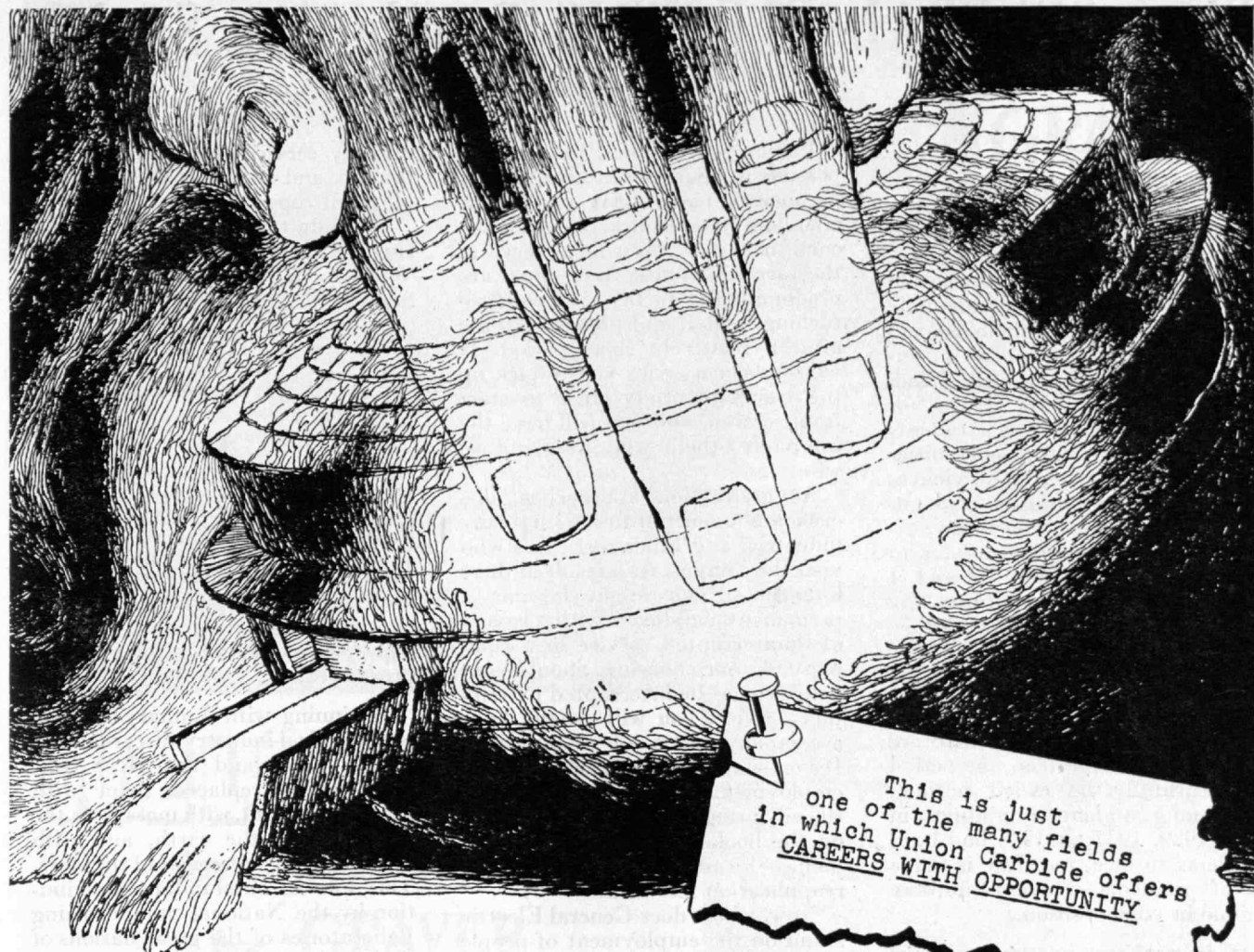
Today, you need a builder whose many years of specializing in industrial construction has established dependable sources of critical materials—and whose organization has the know-how to build efficiently under war conditions.

W. J. BARNEY CORPORATION

FOUNDED 1917
101 PARK AVENUE, NEW YORK

INDUSTRIAL CONSTRUCTION

Alfred T. Glassett, '20, President



What's cooking...

From the raging heat of this furnace come basic materials for your stainless steel kitchenware, plastic shower curtains, and man-made textiles

What's cooking in the seething, roaring fire of this electric arc furnace?

The fingers? No! They represent what's doing the cooking.

WHITE-HOT INFERNO—In the actual furnace the fingers are giant rods of carbon or graphite, called electrodes, that carry the heat-creating electricity. Carbon and graphite are the only materials that can do this and stand up under the terrific temperatures of 6,000 degrees or more.

In carbon arc furnaces, alloy metals used in producing stainless steel are separated from their ores. Similar furnaces are used to make other tough and hard varieties of fine steels for automobiles, airplanes and many other familiar products.

SERVES YOU MANY WAYS—But steel making is only one important way in which carbon and graphite serve you. Motion picture screens are illuminated by the brilliant light of the carbon arc. Calcium carbide, the source of many

modern plastics, textiles and chemicals is an electric furnace product. Without carbon we wouldn't have dependable, long-life dry batteries for flashlights, radios and hearing aids.

WORK OF UCC—Creating carbon and graphite products for an almost endless number of uses is one of the many accomplishments of the people of Union Carbide.

STUDENTS and STUDENT ADVISERS

Learn more about the many fields in which Union Carbide offers career opportunities. Write for the free illustrated booklet "Products and Processes" which describes the various activities of UCC in the fields of ALLOYS, CARBONS, CHEMICALS, GASES, and PLASTICS. Ask for booklet N-2.



UNION CARBIDE AND CARBON CORPORATION

30 EAST 42ND STREET  NEW YORK 17, N. Y.

UCC's Trade-marked Products of Alloys, Carbons, Chemicals, Gases, and Plastics include

NATIONAL Carbons • ACHESON Electrodes • ELECTROMET Alloys and Metals • HAYNES STELLITE Alloys
PREST-O-LITE Acetylene • LINDE Oxygen • PYROFAX Gas • SYNTHETIC ORGANIC CHEMICALS
EVEREADY Flashlights and Batteries • PRESTONE and TREK Anti-Freezes • BAKELITE, KRENE, and VINYLITE Plastics

What GENERAL ELECTRIC People Are Saying

G. A. RIETZ

Educational Service Division

PROBLEMS FACING ENGINEERING AND SCIENCE STUDENTS: We are experiencing a growing appreciation of the importance of an adequate supply of well-trained engineers and scientists to this country's immediate and future welfare. And, although this situation creates for science and engineering students such as you excellent opportunities for future employment, it also leaves you plagued by confusion and uncertainty. No doubt you find yourselves searching for the answers to many questions: "Why should I study?" "Should I continue my education or enlist for military service?" "Should I even bother talking to industrial recruiters who visit the campus?"

No one can deny that these are uncertain times. But no one period can truthfully be called normal. The young student or graduate in 1917, 1929, 1937, or 1941 had hard problems to face, too. Life is made up of problems. There is nothing unique in your position.

It is not certain that military service will interrupt your schooling. If it should, however, remember this: You, as college graduates, will normally expect to pursue your individual occupations for something in excess of forty years. Productive work is, then, a lifetime proposition. All your schooling has been a preparation for this. A period of two, or even five, years of service would represent a relatively small portion of your total professional life. It wouldn't seem wise, then, to allow such a brief interruption to prompt unwise decisions that will affect your entire future.

I suppose good advice is a commodity of which there is a surplus, and therefore, you may not be inclined to take it seriously. I'm aware, too, that Socrates' life was ended by the poison cup, and he was a giver of advice. However, I'll chance it. The following advice parallels closely that being given by well-informed fathers to perplexed sons in school.

Pursue your studies. Go as far as possible in your chosen field. Don't, because of uncertainty or despair, abandon your studies. Should it become necessary for you to serve in the armed forces, the odds are predominantly in favor of your returning to civil and professional life after a relatively short period. It will be far easier for you to pick up the traces of study than to start from scratch, and you will have the jump on others who were not so wise.

As graduation approaches, discuss job opportunities with many industrial and other recruiters who visit the campus. As a result of these interviews, you might become a permanent employee with promise of uninterrupted service in a company of your choosing. Should your employment be interrupted by military service, you will usually have a company and a job to return to. If you should go into service before employment, at least you will have the advantage of having your record on the books of a number of companies, awaiting your return and reapplication for work.

Now, where does General Electric stand on the employment of people like you in these times? Regardless of Reserve or Selective Service status, we want to interview all students who wish to see us. And, regardless of status, we will make job offers to those young men and women we would like to have as members of the General Electric family.

Should any of these people be called into the service before reporting to us for work, our offers will still be waiting for them on their return.

Barring an exceptional, and unforeseen, military situation of such long duration that an abnormal accumulation of commitments does not permit us to meet the last ones made, those men and women already with us before being called for

military service will maintain continuity, and will be assured of employment upon return.

We didn't have to go back on a single commitment following World War II. We trust we will never have to.

*Kansas State College
Manhattan, Kansas
October 11, 1951*



E. S. LEE

General Electric Review

MEASUREMENTS UNIVERSAL: World understanding through scientific discoveries, engineering achievements, and measurements has forever been prominent.

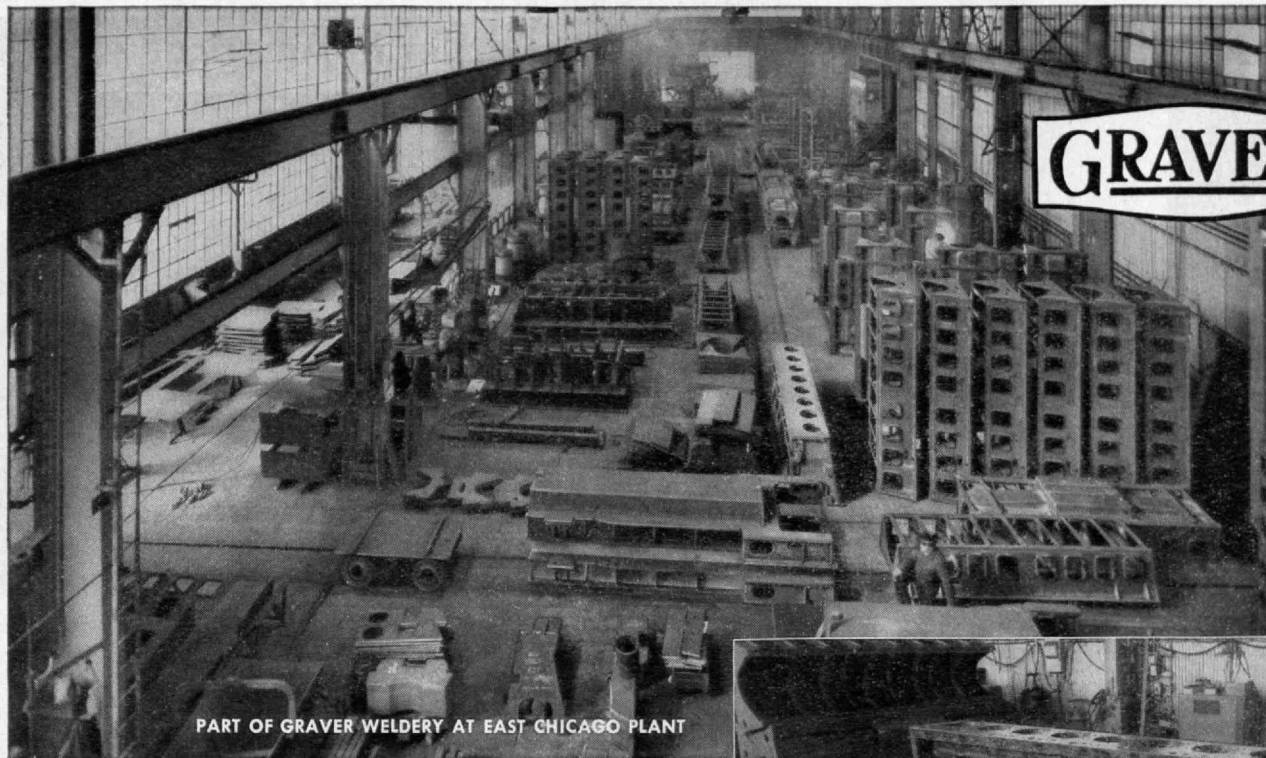
Beginning with January 1, 1948, the electrical industry discarded the mercury ohm and the silver volt-ammeter, and replaced them with length from light, with mass from the attraction of the earth, and with time from the movement of the stars. This was an outstanding contribution by the National Standardizing Laboratories of the great nations of the world and was the culmination of over forty years of the finest of measurements and measuring technique. And in this the scientists and engineers of our own United States National Bureau of Standards were leaders. We can be proud of their accomplishments.

And we are glad to recognize the engineers and scientists in General Electric Company who see in measurements the continuing opportunity for making available new knowledge to give certainty to product design and manufacture. This is the role of measurements in industry. Of their fundamental need there is no end.

*G-E Review
November, 1951*

You can put your confidence in—

GENERAL  ELECTRIC



GRAVER

PART OF GRAVER WELDERY AT EAST CHICAGO PLANT

WELDMENTS

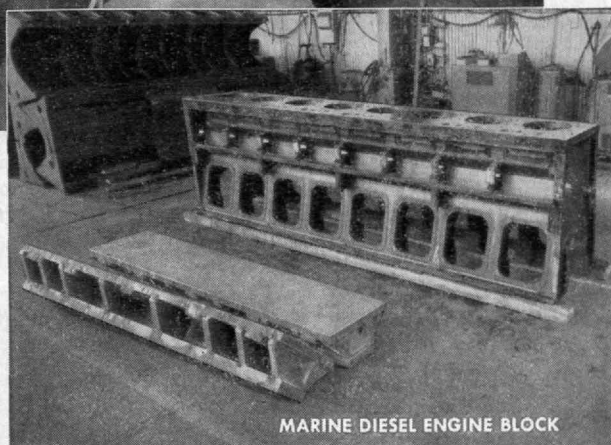
in a wide range
by **GRAVER**

Manufacturers in the heavy industries field have for many years found Graver an excellent source for welded sub-assemblies. From Graver's well-equipped weldery has flowed a continuous succession of weldments for a wide range of industries. Pictured are examples of recent Graver work . . . mass-produced but expertly fabricated . . . with the special advantages secured through subcontracting to Graver: economy in cost, rigid quality controls, creative engineering and sound welding research.

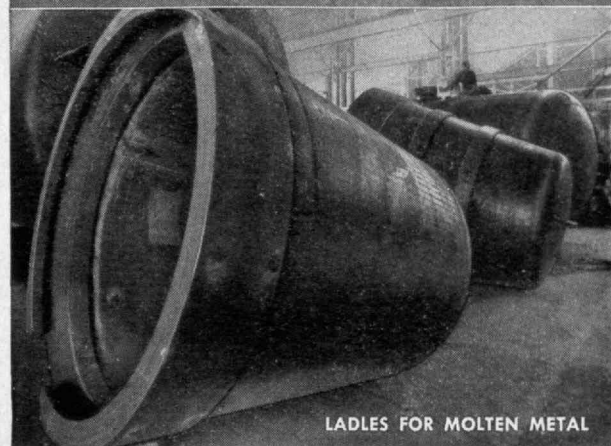
GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA

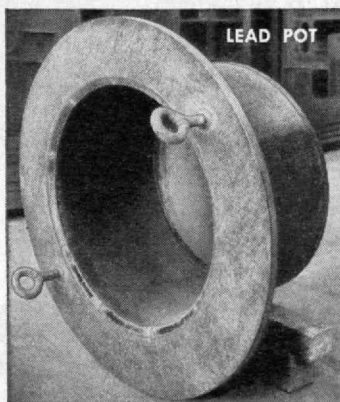
NEW YORK • CHICAGO • PHILADELPHIA • WASHINGTON
DETROIT • CINCINNATI • CATASAUQUA, PA.
HOUSTON • SAND SPRINGS, OKLA.



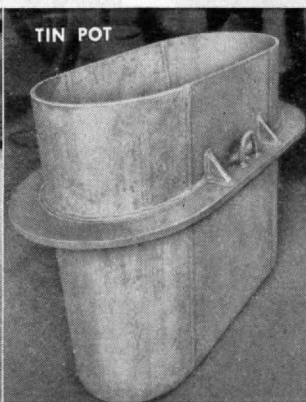
MARINE DIESEL ENGINE BLOCK



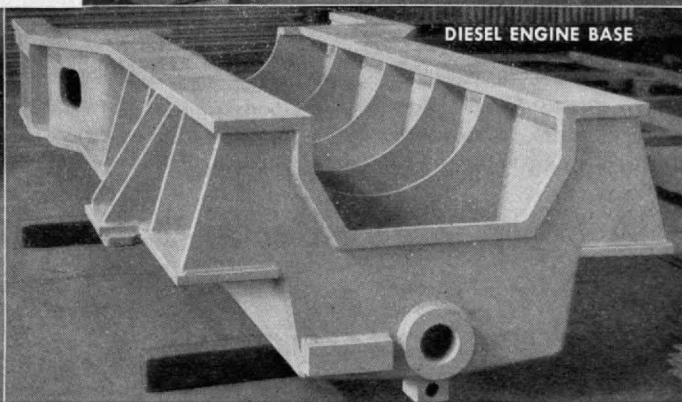
LADLES FOR MOLTEN METAL



LEAD POT

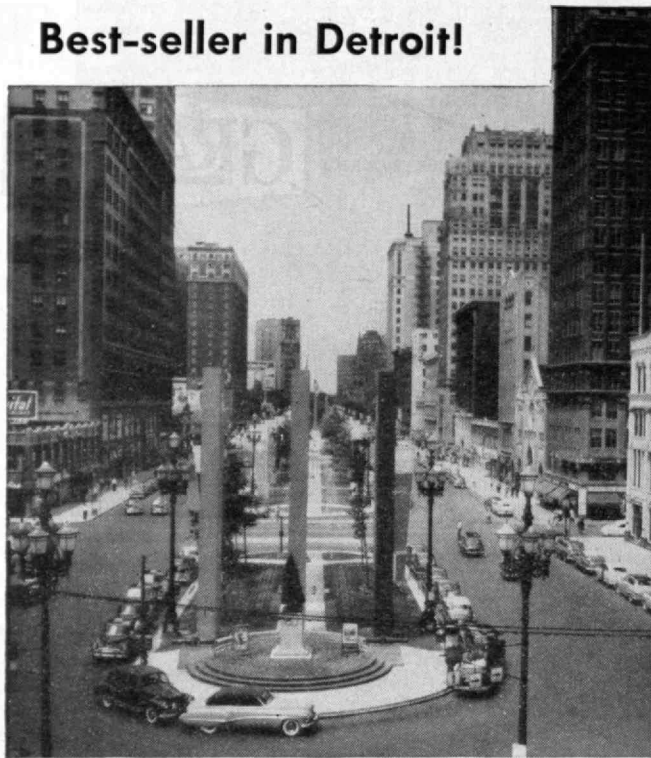


TIN POT



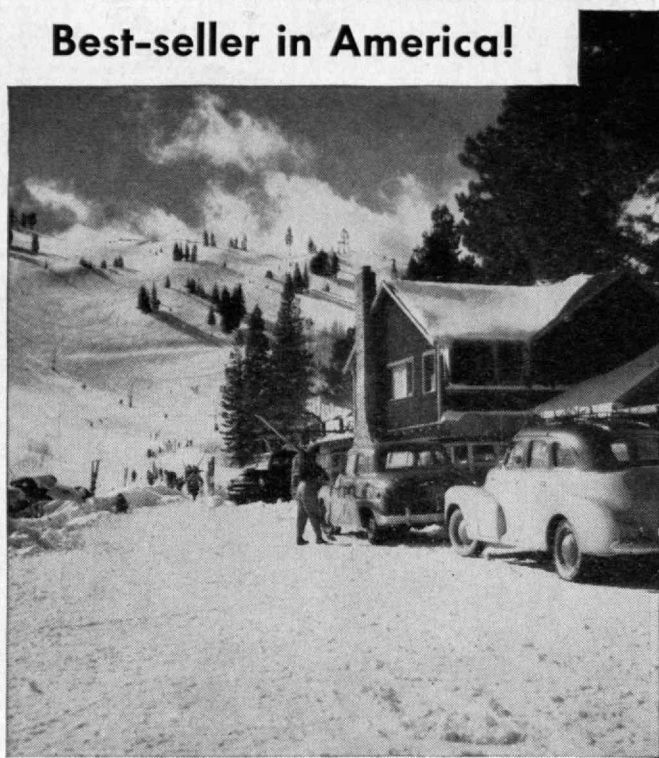
DIESEL ENGINE BASE

Best-seller in Detroit!



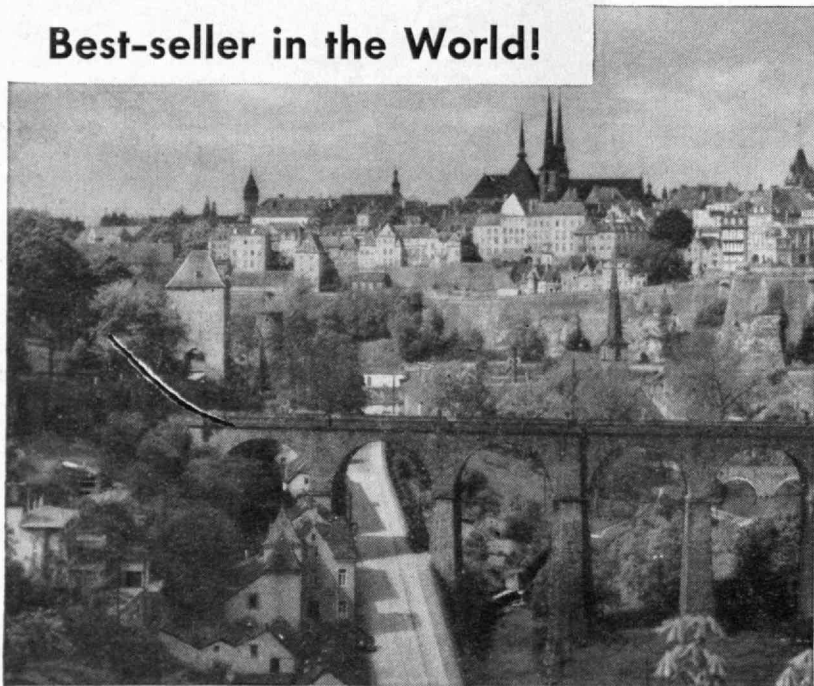
Car makers know tires—and use more Goodyear Super-Cushions than any other tire. They've found they're tops in not just *one*, but *three* ways—for *safety*, for *comfort*, for *mileage*! (Above: Washington Blvd., Detroit, Mich.)

Best-seller in America!

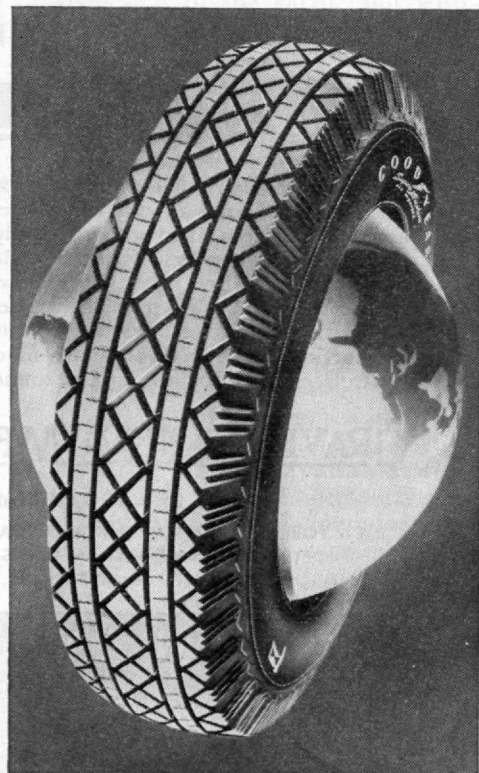


Car owners who drive *billions* of miles yearly buy more Goodyear Super-Cushions than any other low-pressure tire! They've found no equal to Goodyear's triple value of *safety*, *long mileage*, and *soft riding*. (Mt. Rose, Nev.)

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More people the world over ride on Goodyear tires than on any other kind! Doesn't it stand to reason that the tire that gives the most people the greatest satisfaction is the tire for you to buy? (Above: Luxembourg from Rue de Trèves.)



More people ride on Goodyear tires than on any other kind

Super  *cushion* by **GOOD  YEAR**

Super-Cushion, T. M.—The Goodyear Tire & Rubber Company, Akron, Ohio

THE TECHNOLOGY REVIEW



*"Would you cash this check
for me, please?"*

THE TECHNOLOGY REVIEW

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CONTENTS for January, 1952

Vol. 54, No. 3

WINTER ON BEACON HILL • Photograph by Raymond E. Hanson ...

THE COVER

TECHNOLOGICAL SPIRES • Photograph by Ward Allan Howe . . .

FRONTISPICE 132

THE SIGNIFICANCE OF THE HELICOPTER By L. WELCH POGUE 137

The versatility of the small helicopter is discussed in the first installment of a two-part article

BENEFICIATION OF ORES By ANTOINE M. GAUDIN, FRANK E.

SENFLE, and WILFRED L. FREYBERGER 143

Artificially induced radioactivity, employing the nuclear properties of elements found in each mineral, is under investigation as a means of mineral separation

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SPEECH AND COMMUNICATION PROBLEMS By FRIEDRICH VILBIG 145

Visible speech films, for recording and transcribing sound, provide an effective method of research in the communication and linguistic fields

THE TABULAR VIEW • Contributors and Contributions 124

MAIL RETURNS • Letters from Review Readers 126

THE TREND OF AFFAIRS • News of Science and Engineering 133

THE INSTITUTE GAZETTE • Relating to the Massachusetts Institute of Technology 147

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Ward Allan Howe

Technological Spires — as seen through Brooklyn Bridge steel tracery

THE TECHNOLOGY REVIEW

Vol. 54, No. 3



January, 1952

The Trend of Affairs

Happy New Year

THE old custom of reviewing progress of the old year and looking, forever hopefully, toward the potentialities of the new, takes on renewed significance this month as we are able to assess events of the first year of the second half of the Twentieth Century.

As recorded in President Killian's annual report, during 1951, M.I.T. has:

1. Successfully concluded its \$20,000,000 Development Fund campaign.
2. Completed construction of the Hydrodynamics Laboratory and Ship Model Towing Tank.
3. Created a School of Industrial Management.
4. Elevated the Division of Humanities to the School of Humanities and Social Studies.
5. Revised the curriculum of several of its courses.
6. Taken an important step toward making the Institute a residential college by converting the Riverside Apartment Hotel into Burton House, a student dormitory.
7. Greatly extended the scope and variety of subjects offered during the Summer Session.
8. Begun construction on the Sloan Metals Processing Laboratory and the John Thompson Dorrance Laboratory for Biology and Food Technology.
9. Obtained an official residence for the Dean of Students.
10. Created the Office of Publications.
11. Established counseling activities for preparatory students who expect to attend M.I.T.
12. Begun work on a Faculty Club.

In addition to these major achievements, many minor ones have added to the effectiveness of teaching, research, or administration activities at Technology.

As for the products which M.I.T. turns out, the demand for all technically trained personnel continued high. In certain fields (such as physics, electronics, aeronautical engineering, and mechanical engineering,

for example) the shortage of man power has been extremely acute. Production and wages were high throughout the year. So too were taxes which, along with prices, reached unprecedented peacetime heights. But as taxes, prices, and wage rates spiraled ever upward, the ordinary citizen was likely to find the purchasing power of his "take-home pay" diminishing ominously.

Especially during the last few months of the year, large numbers of public officials suffered from ill health as epidemics of Potomac poisoning, mink anaphylaxis, and tax scandalitis swept the country from coast to coast. Apparently, all three diseases are closely related occupational hazards of, and may even be endemic to, political appointees. Because modern protective measures are unusually effective, symptoms are not readily detected in the early stages and the maladies are seldom politically fatal, except possibly quadrennially.

In Korea, almost the entire second half of the year was spent in futile armistice talks while the enemy built up his reserves of air- and man-power. At the time of writing, hostilities have come to a virtual standstill. Korea has not been unified under its own free rule, as was originally stated to be the United Nations objective. Instead, since December, 1950, nearly all of North Korea has been lost to the enemy. Since the beginning of the Korean "police action" the United States has suffered more than 101,000 casualties, of whom more than 17,000 have made the supreme sacrifice. Possibly one third of these fatalities may be accounted for as prisoner-of-war murders by an enemy whose face it is necessary to save.

The peoples of the world sorely desire peace, but this is not the greatest need. There can be no peace worthy of the name without mutual trust and confidence, without respect and integrity, without honesty and high moral principles, without culture and a return to religious precepts. These are the things to work for if 1952 is to be a happy new year.



Olga Ley

In the Trend of Affairs section last month, there was published an unidentified photograph of a peacetime vehicle bearing a strong resemblance to a cannon. Our promise to eliminate any additional guessing is hereby fulfilled by revealing that the apparatus shown on page 78 of the December, 1951, issue is a huge concrete mixer of unusual design, towed by a Diesel-powered, two-wheeled prime mover. Approximately seven cubic yards of concrete can be mixed in its 34-foot barrel en route to a construction site. The machine can traverse rough terrain and discharge concrete at a height of 20 feet.

Radioactive Water Supplies

DISCHARGE of radioactive wastes by the large, new atomic energy industry, together with the effluents which may be forthcoming with the projected expansion of industries utilizing nuclear energy, has given rise to a new type of stream pollution. Added to the normal peacetime activities of the industry is the ubiquitous prospect of warfare with atomic weapons and radiological agents. Because a safe water supply is essential to safeguard public health, the waterworks engineer must be prepared to cope with problems of radioactive contamination of water supplies.

The ideal goal of the atomic energy industry is that no radioactive substances be released from its installations. This is a standard which is impossible to attain and, in the future, may not be feasible to approach economically. It is apparent that the wastes of the atomic energy industry present a far-reaching problem that will not permit a period of procrastination, such as has prevailed during the development of our current stream pollution conditions with liquid wastes from industry.

Anticipating the need for early solutions to this important problem, studies on the removal of radioisotopes by water treatment processes have been in progress in the Sedgwick Laboratories of Sanitary Science at M.I.T. in a research project sponsored by the Atomic Energy Commission. Under the direction of Rolf Eliassen, '32, Professor of Sanitary Engineering, the program was conducted by John B. Nesbitt, '49, a research assistant, and former research assistants Warren J. Kaufman, '47, and Morton I. Goldman, '50, of the Department of Civil and Sanitary Engineering.

The problem of the removal of radioisotopes from water is essentially one of the selective removal of specific elements present in ionic form when these elements include a sufficient number of radioactive species to constitute a radiological health hazard. The problem must be studied by a consideration of the basic sciences as well as by pilot plant applications to substantiate techniques developed from fundamental research. In the program of research at the Institute, radioactive phosphorus, as orthophosphate, was selected for the required studies because of its widespread use in tracer applications and because it may be produced in reactor cooling waters high in sulfates. Alum and ferric sulfate were studied as agents for coagulating radioactive ions, while clays were employed to simulate natural turbidities and also to serve as coagulant aids. Three typical surface waters were synthesized for the detailed study: a soft New England water, a Midwest water of good coagulating characteristics, and a hard water enabling the use of a softening process. Tests of the removal of orthophosphate by coagulation were made on each type of water under a variety of turbidities and coagulant dosages, and pilot plant runs were made on Ohio River water.

The tests indicate that conditions which gave excellent removal of phosphate, gave only fair removal of strontium and no removal of iodine. This emphasizes the fact that the removal of radioactivity from water depends upon the chemical or ionic form in which that radioactivity appears. The coagulation process is the major mechanism involved in the removal of radioactive phosphate from water. Clays were found not to bring about appreciable removal of phosphorus unless used in conjunction with hydrolyzing coagulants. Strontium, and other multivalent cations are best removed by coagulation processes yielding negatively charged floc particles such as are encountered in lime-soda softening or phosphate-lime coagulation. In all runs the removal of radioactivity was found to exceed 99 per cent.

From research conducted thus far, it is clearly evident that effective means of safeguarding public water supplies against radioactive contamination is economically feasible through suitable water treatment. The type of treatment for optimum removal of radioactivity depends upon the form in which radioactivity is present.

Oh Schwa!

ANYONE who attempted to pronounce the English language as it is spelled would be largely unintelligible. Moreover, one who gives each English word only one pronunciation, regardless of the context, renders the appearance of affectation or of limited familiarity with the language. Many English words have more than one accepted pronunciation; some may correctly be said in a number of ways.

The wide variations in accepted English pronunciation are related not only to regional usages and degree of formality of the speech, but also to the rhythms and accents of the phrase in which the word occurs. Some of the variations in pronunciation are not given in regular dictionaries, but all may be found in specialized lexicons, such as *A Pronouncing Dictionary of American English* by John S. Kenyon and Thomas A. Knott.*

Much of the variability in pronunciation of a given word arises from a strong tendency of some English vowel sounds to lose their individuality, and to be replaced by a neutral sound which phoneticians call the "schwa." This sound, produced by expulsion of breath with the vocal organs in a generally relaxed position, decidedly resembles a grunt or groan. The schwa occurs frequently in even the most precisely spoken English. For example, the vowels of "above" can be pronounced in no other way. If the reader will say this word aloud, he can satisfy himself that both the *a* and the *o* are pronounced with the equivalent of a grunt.

But in good English, spoken in informal and conversational situations, the schwa supplants more and more vowels. As a random example, take the phrase, "Massachusetts Institute of Technology." When these words are pronounced with utmost formality, the schwa appears as the second *a* of "Massachusetts" and as the *o* in "of." But in flowing colloquial speech, the schwa occurs in three additional places: the *e* of "Massachusetts," the second *i* of "Institute," and the second *o* in "Technology." Thus, if we print an asterisk for the schwa sound, the colloquial pronunciation of this phrase is "Mass*chus*ts Inst*tute *f Technol*gy."

Such free use of the schwa does not endanger intelligibility, as the consonant framework of many words identifies them fully and the context makes meanings clear. In fact, easy speech with liberal use of the schwa sound has acceptance today as the standard for radio and the stage.

These observations bring to mind a recent article in the scientific press describing a group of Bushmen who inhabit the fringes of the Kalahari Desert in Africa. The language of these people is described as consisting mainly of clicks made with the tongue against the roof of the mouth. Such speech is considered to be the most primitive known form of human communication. Although the English-speaking person employs clicks only in addressing horses or other animals, it is striking to note the predominance in current American speech of a similarly rudimentary sound — the schwa.

High Temperature, High Stress Alloys

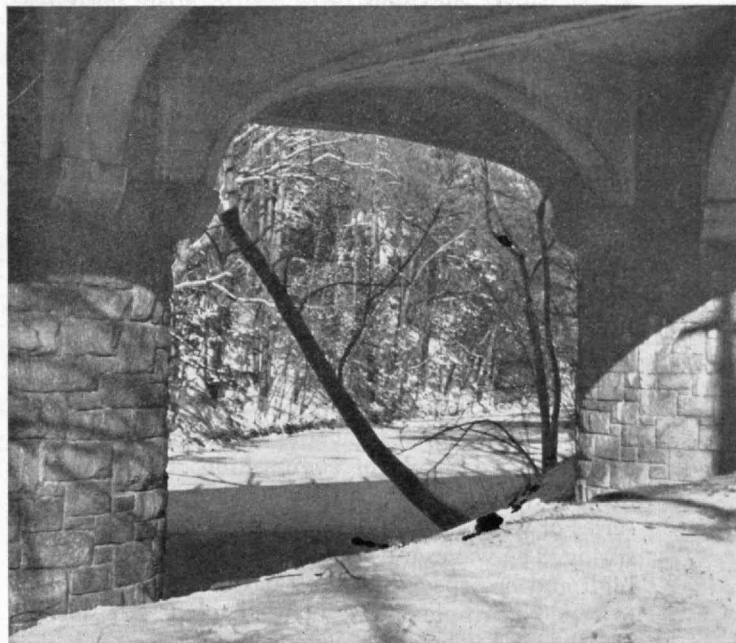
A WIDE range of alloys in the chromium-molybdenum-nickel ternary system may be susceptible to heat treatment to make better high-stress, high-temperature parts, such as those in gas turbines and jet engines. A recent study of alloys has led to a critical examination of the chromium-nickel binary system diagram by the Department of Metallurgy at M.I.T. This was necessary as structures which were being obtained in the ternary system could not be predicted from examination of the binary-phase systems. It is anticipated that chromium-molybdenum-nickel alloys may permit the use of temperatures as high as 1,800 degrees F. in gas turbines, as compared to the present level of about 1,500 degrees F. based on the use of cobalt base alloys.

It has now been established that chromium undergoes a transformation in its crystal structure about 100 degrees below its melting point, which is about 1,930 degrees C. At the temperature of transformation (1,830 degrees C.), chromium changes from a high-temperature, face-centered cubic structure to the established low-temperature, body-centered cubic structure. The Cr-Ni phase diagram under these circumstances changes from that of a simple eutectic system to a system containing both a eutectic and eutectoid transformation, the eutectoid temperature being about 1,180 degrees C., with a eutectoidal composition of 63 per cent chromium and 37 per cent nickel. One of the interesting possibilities is that a wide range of chromium-nickel alloys may now be susceptible to heat treatment in the same sense that steels are.

In this work, conducted by Nicholas J. Grant, '44, Associate Professor of Metallurgy, and David S. Bloom, '47, a research assistant in the Department of Metallurgy, it has already been determined that martensitic-type structures can be obtained by quenching from above the eutectoid temperature.

The research program described above was conducted under the sponsorship of the Bureau of Aeronautics of the Navy Department.

Irwin Fait



* Springfield: G. and C. Merriam Company, 1944. \$3.00.



David R. Knox, '27

The spires of Notre Dame de Chartres, or Chartres Cathedral, as it is more commonly known, located in the city of Chartres, France

Shoes That Walk for You

By DAVID O. WOODBURY

IT is widely said that there has been no basic improvement in the design or principle of shoes since Julius Caesar invented hard heels for the boots of his soldiers. This 2,000 years of stagnation in footwear, however, has apparently come to an end in a new type of shoe, currently being perfected in the Department of Physical Education of the University of Southern California. The new shoes, called "ripple soles," give every promise of having demonstrated an entirely new principle in walking—a principle which cuts down the shock of ground contact by 40 per cent, lengthens the normal stride by six inches, and makes walking a much easier and more invigorating exercise.

The ripple sole shoe is exactly what the name implies. To the standard flat sole of an ordinary shoe is affixed an extra sole of composition rubber, folded into corrugated form, so that the wearer stands on a series of waves which have a considerable amount of spring. The waves are about three quarters of an inch high and are spaced an inch or so apart, from heel to toe. The ripple sole is bonded to the flat sole by cement, and is held permanently in place.

As the wearer steps forward, his heel strikes the ground first, as with common footwear. But instead of the sharp unyielding blow upon the pavement, the kinetic energy of the mass of the foot and shoe is taken up by the first wave of the ripple. The sole then distorts, absorbing the energy and eliminating the shock. An instant later, the next ripple picks up the load and distorts in the same manner, while the first ripple advances the foot slightly, as if it were hinged to the ground. The energy stored in the first ripple begins to flow back into the foot, propelling it forward. This action continues from ripple to ripple, till the toe leaves the ground. The combined effect is somewhat like walking on a special kind of roller skates, except that there is no factor of instability.

The ripple sole shoe came about by chance during the early part of 1951. A retired orthopedic shoe specialist, Nathan Hack, was doing unpaid experimental work for the Department of Physical Education at the University of Southern California, when a research problem in shoes came into the laboratory from the United States Army. This problem was to devise a shoe for parachute troops which would break the shock of landing, and cut down the high incidence of foot and leg injuries characteristic of this military operation. The problem came to the University because Laurence E. Morehouse, research professor in physiology there, had done brilliant work for the Air Corps in combat physiology during World War II.

Morehouse and Hack tackled the paratrooper problem together, with Hack suggesting possible designs for the new shoe. Their first attempt was to fit a shoe with springs. The method of test was to have their laboratory assistants jump off a table onto a hard floor, stiff-legged—a method capable of giving a 12G. shock to the legs and body.

Hack's ripple-sole design came along after a number of trials, but it was not particularly successful in solving the problem in hand. During the tests, however, a number of the jumpers would walk around the room, awaiting their turns. To their amazement they discovered that the shoes gave them a totally new sensation in walking; they described it as like "walking on air."

The designers saw at once that they had hit upon an interesting new principle for general footwear. Dropping the Army tests temporarily, they began a series of studies of walking with the new shoe, analyzing the action of the soles with high-speed motion pictures and elaborate thrust and impact measurements which the laboratory was specially equipped to make. Results were so startling that the design was perfected and a patent obtained on it.

The new ripple sole shoe has lately been brought to the attention of the shoe industry and has resulted in many requests for manufacturing contracts. The shoe, Hack believes, has many valuable applications, especially for occupational wearers, such as postmen, policemen, watchmen, barbers, dentists, and factory workers, who must stand or walk for long hours at a time. It has numerous uses in sports, as in golf, tennis, and possibly some types of track work. And it is likely to be in demand by the general public, women especially, to make walking pleasanter and to relieve the strain on millions of aching American feet.

The Significance of the Helicopter

I. The Small Helicopter

Amazing Versatility Accounts for the Recent Rapid Growth of Helicopter Use in Peace and War

By L. WELCH POGUE

THE past decade has seen the development of an entirely new instrument of transportation—the helicopter. Able to take advantage of basic research already completed in aeronautical and mechanical engineering, it advanced beyond the experimental stage and became a practical vehicle only a few years after the first successful model was flown. Thereafter, its unique feature of combining the best aspects of both automobiles and airplanes saw immediate and varied commercial use.

It was not until the Korean War, however, that the sturdy faith of the pioneers in the helicopter was vindicated and the multiple uses, both actual and potential, of this versatile vehicle were appreciated. Now fully backed by an enthusiastic military, the production of, and further experimentation on, larger transport-size machines are proceeding rapidly.

The first part of this article will outline briefly the early history of the helicopter, its operational characteristics, and the many varied, and ever-increasing uses being made of the smaller helicopters. The second part will deal with the larger machines, capable of carrying seven to 20 or more persons, now a reality, and will undertake to indicate their promise in the field of commercial transportation.

Historical Development

The helicopter traces its lineage to the Sixteenth-Century notebooks of Leonardo da Vinci where there is to be found a sketch of an aircraft consisting of a lifting screw driven about a vertical axis. Intermittent experimentation occurred between that time and the Twentieth Century by a few persistent pioneers. Although deterred at first by the obstacle of inadequate power plants, and, more recently, by the diversion of capital and engineering interest to the principle of lift dependent upon forward speed, as developed in the airplane, these pioneers remained undaunted. Without their studies* the helicopter would not have developed into the practical reality it is today.¹⁻³

It was only when the crude Eighteenth-Century models dependent upon muscle power or spring arrangements, and Nineteenth-Century models deriving rotor power from steam engines, were supplanted by those of the early Twentieth Century utilizing internal combustion engine power, that the problem of direct flight lift began to be conquered.

* Please see numbered references at end of article, page 159.

According to the best information available to the writer, a Frenchman, Louis Bréguet, is generally credited with the first helicopter flight in 1907 when his machine, a helicopter weighing 1,000 pounds, and powered by four rotors, lifted itself a little way off the ground while remaining in control of the pilot.⁴

Subsequently, engineers in both Europe and America experimented with various configurations in an effort to conquer the problem of torque created by the utilization of a powered rotor. They succeeded in constructing machines which could lift themselves off the ground and fly short distances but which were plagued with instability. A few of these pioneers deserving of great credit were: Paul Cornu, Emile and Henri Berliner, Pescara, Stephan Petroczy, Theodor von Karman, D'Ascanio, Etienne Oemichen, von Baumhauer, von Asboth, and Igor Sikorsky. Recognition as a pioneer is also due to the Spanish engineer, Juan de la Cierva, who, in inventing the autogiro and in making his first successful flight in 1923, struggled with, and solved, several of the basic technological problems of rotary wing flight.[†]

The first successful helicopter, however, was built by Heinrich Focke, the designer of some of Germany's best military aircraft, and was flown from Bremen to Berlin in 1937. This machine weighed 2,300 pounds, had a fuselage like a conventional small airplane and blades which were supported on outriggers on either side, rotating in opposite directions to eliminate torque reaction, and was powered by a 106 horsepower engine. It achieved a flight duration of one hour and 20 minutes over a 143-mile course, an altitude of around 11,000 feet, and a maximum speed of 76 miles an hour.

Shortly thereafter, in 1939, Igor Sikorsky, who had resumed his helicopter studies commenced in Kiev in 1909, after working with fixed-wing aircraft in the meantime, produced the first successful machine in this country, utilizing the principle of the single articulated rotor with a smaller auxiliary rotor at the tail to provide torque balance.

This marked the advent of the helicopter industry in the United States.⁵ Truly remarkable progress has been made since then, not only in helicopter design

[†] The chief distinction between the autogiro and the helicopter is that, in the autogiro, the movement of the rotor is caused by the aerodynamic forces set up as a result of the craft's movement through the air (through the use of a conventional propeller), while in the helicopter, power is applied directly to the rotor which determines lift as well as movement in any direction through tilting the direction of lift.



First successful helicopter to be flown in the United States was designed by Igor Sikorsky. Shown at the left is the S-51 helicopter of the Sikorsky Aircraft Division of United Aircraft Corporation.

and production,⁸⁻⁹ but in the wide acceptance and utilization of the helicopter by the armed forces (greatly assisting in its development), by many other government agencies, and by private concerns for use in agriculture, industry, and commerce. Partial credit can be given to the ability to draw from technological advancements already achieved in aircraft and engine design and in metallurgy. However the helicopter would still be but a dream without the brilliant inventors and engineers who have tackled the problem; the farsighted industrialists who risked their capital in backing them, and the many individuals, both in government service and in private life, who have enthusiastically backed the helicopter and have made significant contributions to the advancement of the helicopter art.

Operational Characteristics

What is it that has caused this growth of the helicopter industry in such a short time? The answer to this question lies in the amazing versatility which the craft possesses.

It can ascend and descend vertically. This eliminates its dependence upon conventional expensive airports with their related air-traffic problems. It can hover motionless in mid-air. It can hold a speed varying from zero to maximum. It can stop quickly and hover in mid-air, and it can move sidewise and backwards. In these respects it exceeds the maneuverability of both the airplane and the automobile. With suitable universal (flotation) gear presently in use, it can land on water, ground, swamps, marshy areas, deep snow, or on ice — a boat, aircraft, and surface vehicle all rolled into one.

Still another of the gratifying characteristics of the helicopter is the fact that in the event of power failure it has an "automatic parachute" available through the principle of autorotation of the rotor. This factor, plus careful engineering design, has been responsible for a truly remarkable safety record in helicopter operations.^{10, 11}

Small Helicopter Types††

During the first part of the last 10-year period, helicopter production was limited to two companies: the Sikorsky Aircraft Division of United Aircraft Corporation and the Bell Aircraft Corporation. The production of Sikorsky Aircraft was mostly for military purposes. The production of Bell was used both in military and commercial operations. As would be expected, the first machines of these companies were all small craft with cruising speeds somewhat below 100 miles per hour.

By the end of 1949 Sikorsky Aircraft had delivered approximately 700 of its helicopters. Of these, approximately 500 of the R-4, R-5, and R-6 models were delivered before the cutbacks at the end of World War II, a part of them having been manufactured by Nash-Kelvinator in Detroit under a license agreement. Sikorsky Aircraft's first postwar machine was the four-place Model S-51, which was first flown in February, 1946. In April of 1950 Sikorsky Aircraft brought out the S-52-2, a three- to four-place craft with a useful load of 1,050 pounds.

The Model 47 of the Bell Aircraft Corporation was first flown in October, 1945, and received the first commercial helicopter license to be issued by the Civil Aeronautics Administration in March, 1946. This model, subsequently developed to the 47D series, is now a three-place craft with a useful load of 989 pounds. By the end of 1949, Bell had built and sold over 300 of these small helicopters.

More recently a number of other companies have developed small helicopter models with varying configurations. Among these are Hiller Helicopters, Inc., which has in production its Model 360, a three-place craft which is now in commercial use, particularly on the West Coast. Kaman Aircraft Corporation has also developed a three-place helicopter. Some six other companies have similar models, not yet in large-

†† A discussion of the more recent large transport-type helicopters will appear in Part II of this article.

scale production. Full descriptions of all of these developments are readily available.¹²⁻¹⁴

General Uses of the Small Helicopter

In view of the helicopter's amazing operational characteristics, it is not difficult to realize that it has received wide acceptance by the military. This aspect of the helicopter's success will be discussed in detail below. Even more remarkable, however, in view of the fact that it was only five years ago that the first of the small helicopters was certificated for commercial operations by the Civil Aeronautics Administration, is the reception it has received in agriculture, industry, commerce, and many other fields.

There are now over 40 companies, in this country alone, specializing in helicopter operations. Quick to recognize the unique operational characteristics of the helicopter, they now stand ready to perform a variety of jobs — everything from spraying a single field to rid it of the potato bug, to engaging in extensive aerial survey work in rugged Alaskan terrain of the Northwest on behalf of the United States Geological Survey.

These enterprising new commercial operators have been tested in the crucible of competition and have come out with flying colors even though hampered with the high initial capital outlay of the helicopter itself and high operating costs normally to be expected in any newly developed machine, both obstacles of which will be minimized as quantity production and further improvements occur.

Agricultural Uses. One of the most important commercial utilizations of the small helicopter has been in crop dusting and spraying. Although presently more expensive than either surface or conventional aircraft spraying, helicopter spraying has now passed from the experimental stage to become the main business of a number of companies in farming areas in the United States and, indeed, all over the world.

The helicopter, however, not only accomplishes a job faster than ground equipment but it can be used when ground equipment cannot be used, as, for example, when the ground is too wet. This is of particular importance in the case of cranberry bogs and similar fields where ground equipment would destroy portions of the crop. The helicopter, in many instances, is also superior to conventional aircraft in dusting. Its unique slow-motion quality permits precisional treatment unattainable by aircraft. It can also be used for dusting where topographical features prevent aircraft from operating, where airport refueling points are far from the fields to be dusted, or where a wind is present which would carry away aircraft spray before it has time to settle or, indeed, might carry the spray to an adjoining crop of a different type to which the spray may be harmful. The helicopter can also seek out pests before they reach damageable crops, as the farmers of Argentina will attest in view of the successful attacks on locust hordes. Some 16 small Bell helicopters have been engaged in the battle in Argentina alone, and similar experiences have been recorded in Iraq and Venezuela.

Increasingly more frequent uses in agriculture may be found for the unique downdraft created by the helicopter. Thus it has been used literally to "blow away" the drops of water which collect at the base of cherry stems after a rain and to eliminate the water absorption which may swell the fruit and can break the skin. It has also been used to force a downdraft of warmer air onto a crop threatened with frost, and to raise ground temperature — which is particularly important where smudge pots are undesirable because of nuisance to nearby residential areas. Its downdraft was recently used to harvest 1,500 acres of figs at a rate of one acre per minute.

In days to come, particularly with the decrease in the cost of the helicopter, the farmer may well find it an all-around work horse.¹⁵⁻¹⁷

The H-13D helicopter of the Bell Aircraft Corporation shown here is the Army version of the Model 47 helicopter. First flown in the fall of 1945, the Model 47 initiated commercial helicopter flying in the United States.





United States Army air-evacuation type helicopter, H-23A, manufactured by Hiller Helicopters, Inc.

Power and Pipe-line Patrol. Another important use of the helicopters has been in power and pipe-line patrol, in both private and public enterprises. Originally envisioned by Bell and three private power companies in California, the idea is now utilized by a number of companies in this country and in Canada. Contracts have been let for helicopter patrol of the 2,500-mile Bonneville Power System in the Portland-Seattle area since the summer of 1948, and to provide routine inspections over the 7,000 circuit miles of power lines which form the Tennessee Valley Authority's far-flung system since February of 1949. T.V.A. has experienced a reduction of costs by half since the helicopter can patrol some 800 miles a week, as opposed to the 40 miles per week possible for a man on foot. Furthermore, helicopter inspection affords an opportunity to see the condition of power lines not readily discernible from the ground.¹⁸⁻²⁰

Oil Survey and Mineral Detection. The marshlands of Louisiana have long been inaccessible to geologists in their search for oil. This problem was conquered to some extent by the use of the cumbersome marsh buggy, but soon conflicted with another important Louisiana industry by destroying the muskrat runs. The helicopter was then brought in to engage in the gravity-meter survey (the equipment for which weighs only around 60 pounds), but its temporary use quickly became permanent when it was realized how much faster it could do the job and at approximately one-third of the cost. By the beginning of 1950 there were 10 helicopters engaged in full-time oil surveys in Louisiana alone.²¹⁻²³

The helicopter is also used in mineral detection—not only from the air but as a vehicle for reaching inaccessible areas for ground surveys and eliminating the "walk in," whether in the jungles of Guatemala or in the mountains of Canada.²⁴

Forest Service. The value of the helicopter to forestry has been proved under a number of dramatic circumstances. By 1948 helicopters had been utilized in five major forest fires in California alone, and a

veteran of the Forest Service, United States Department of Agriculture, was able to declare that "after 25 years I have seen what I dreamed of—a service that gets me what I need there right now." A crew of men, untired by the "walk in" (usually accompanied by exhausting mountain climbing), can be brought directly to the burning area and kept supplied. The downdraft of the helicopter itself again comes into play by whipping up backfires and retarding free-burning brush fires by kicking up an adverse wind in its face.^{25, 26} In addition the Forest Service has officially recognized the helicopter as the most efficient way to carry on the process, begun in 1932, of reseeding rocky, fire-denuded watersheds with mustard seed, to retard soil erosion and to assist in reforestation. At first, hand sowing was used but that required 10 days for a 12-man crew to seed 1,000 acres. Seeding from airplanes was tried next, but then areas along steep slopes, unavailable to the airplane, could not be seeded at all; seed distribution was uneven, and markers and signalmen were required on the ground to keep the pilot on his course and advise him of too light or too heavy seed discharge, or of areas that he had missed. Along came the helicopter, however, and seeded some 1,045 acres in eight and a half hours with an even distribution at a cost of about \$0.025 more an acre than the airplane. These, and other advantages, have led the Forest Service to use over 2,000 hours of helicopters during the years 1948 and 1949 alone—just the beginning.

Cartography. Other agencies of the government have recognized the tremendous value of the helicopter in mapping work, in particular the United States Coast and Geodetic Survey, the United States Geological Survey, and the Army Map Service. These activities have been carried on in such widely separated places as Death Valley in California, Colorado, Cuba, Panama, and Alaska. In Alaska alone there were nine helicopters operating during the summer of 1949 and the operating cost per mile was \$4.00 cheaper than

ground travel for a similar adjacent area. To the saving in dollars should be added the tremendous savings in time, since an engineer can cover several times as much area in the same amount of time without exhausting hours of climbing. In addition to its function as an aerial pack mule carrying personnel and supplies to inaccessible places, the helicopter has been used as a basic mapping instrument concerned with profiling and triangulation. It can hover directly over the position of a proposed ground station: the hovering helicopter can be utilized as the triangulation point for ground observers, and the heights of needed towers can be determined accurately by a weighted steel tape suspended from the helicopter.²⁷⁻²⁹

Coast Patrol and Rescue Work. One of the most vital functions which the helicopter can perform is that of coast patrol and rescue work. The Coast Guard was one of the first users of the helicopter. Recognizing the helicopter's amazing versatility has led to a stepping up of its functions as a "sea nurse"³⁰ and many a lost fisherman and sick mariner afloat owe their safety, and often their survival, to its use. Light-house supply and pilot duties in harbors are just a few of the other functions which small helicopters have, and can continue to perform.

Traffic Control. The forward-looking New York Police Department added its first helicopter, a Bell, to its force in the latter part of 1948. Soon the papers were filled with stories of helicopter rescues by the police from the East River, the Hudson, and the New Jersey marshes. In June, 1950, three of Bell's latest Model 47D's were added to the New York police force. These helicopters were soon put to multiple uses, including rescue work, and the more efficient exercise of the important function of traffic control utilizing the superior intelligence gained from a bird's-eye view of the situation in transmitting directions to those on the ground.^{10, 31}

Mail Service—The Forerunner of Metropolitan Passenger and Property Service. Perhaps the most

publicized commercial use of the small helicopter has been in expediting mail service in metropolitan Los Angeles and Chicago. Although these operations have and will continue to perform a great public service in their own right, one of their greatest contributions has been in developing the experience from which will spring metropolitan area passenger and property service, utilizing large transport helicopters as described more fully in Part II of this article.

It is a well-known fact that most of the time in air-mail delivery is consumed in ground time at the point of origination and destination, rather than in direct flight. If a helicopter could pick up the letter at the suburban point and carry it directly to the airport, and, at the other end, carry it directly from the airport to the suburban destination, this ground time would be substantially reduced.

Pursuant to this principle, and probably with the desire to accumulate experimental information as to a scheduled helicopter operation upon which to base conclusions as to passenger potentialities, the Civil Aeronautics Board granted Los Angeles Airways a certificate of public convenience and necessity in June of 1947 authorizing it to operate between the airport and some 29 suburban points in the Los Angeles Area, as well as between the airport and the main city post office. Utilizing five Sikorsky four-place S-51 helicopters, the company has been flying scheduled air-mail service since October of 1947 (now on both day and night schedules) with better than a 96 per cent completion factor, and up to November of 1950 had carried over 10,000,000 pounds of mail in some 100,000 flights. On May 1, 1951, the Assistant Postmaster General testified that this Los Angeles helicopter service had cost the Department three mills per piece of mail carried.³²

Similarly, Helicopter Air Service was granted a certificate in November, 1948, to serve the Chicago Metropolitan Area and commenced service in August of 1949. Service is provided by a shuttle route between the Midway Airport and the General Post Office in

The HTK-1 helicopter of the Kaman Aircraft Corporation is convertible into an aerial ambulance and will carry pilot, attendant, and litter.





The "Little Henry" helicopter of the McDonnell Aircraft Corporation seats two passengers. This helicopter appears to be stripped of all nonessentials.

downtown Chicago (flown 18 times daily) and three circular routes serving 43 suburban communities (flown 3 times daily) which are 106, 102, and 89 miles long, respectively. Utilizing six Bell three-place Model 47D helicopters, the company achieved a completion factor of 95.48 per cent during its first year of operation and carried over 2,190,790 pounds of mail.

The use of the helicopter in expediting air-mail delivery has spread to the continent of Europe. Belgium now has such scheduled helicopter service from Brussels commenced in August, 1950, and conducted by Sabena Airlines, serving eight cities with two Bell Model 47D-1 helicopters.³³ British European Airways instituted a scheduled helicopter passenger service on June 1, 1950, between Liverpool and Cardiff utilizing three Sikorsky S-51 helicopters, and by the end of the year had attained a 96.5 per cent completion factor. It has recognized, however, that passenger service can best be provided with larger craft.³⁴⁻³⁶

Miscellaneous Commercial Uses. Only a beginning has been made in the discovery of uses for the small helicopter. The Game Department of the State of Washington has utilized the helicopter for determining the size of elk herds and the sufficiency of feeding areas.³⁷ Helicopters have been used on a number of occasions in the deadly fight with the anopheles mosquito in spraying stagnant pools to prevent malaria,^{17, 38} and many civic health departments are taking increased interest in this activity, as possibly being the preventative of polio as well.¹⁷ The value of the helicopter in the fishing industry has been touched upon when it sought out schools of tuna and whale and radioed the fishing fleet an exact location thereof,^{17, 39, 40} and when it planted trout in the waters of the State of Washington.⁴¹ The success which helicopters have had in military wire-laying points to an important peacetime use in this activity, as well as pipe laying.^{42, 43} Its value in saving time in travel when important persons must be transported from building to building is apparent.⁴⁴⁻⁴⁶

A forerunner of extensive passenger service to be discussed in detail later has been a company which started a tourist service in the Grand Canyon area on June 1, 1950, and by the end of the year had carried over 2,000 passengers and now has three Hiller 360's (Hiller Helicopters, Inc.) in use.⁴⁷ The utilization of large "flying cranes" in construction activities in isolated areas was recently pioneered when a dam was built near Vancouver, British Columbia. Some 400,000 pounds of materials, equipment, and supplies were flown in by helicopter from a loading base five miles away to a 15-foot square landing field blasted out of the rock.⁴⁸ As for the rest, all that can be said is that the helicopter has been used for everything from taking movies of game herds in the Belgian Congo,^{49, 50} to making a snow survey in California to gauge the water supply,⁵¹ to searching for Indian relics in the Canal Zone.⁵² Its use by newspapers for fast and unusual coverage,¹⁷ as a relaying station to extend the range of television transmitters, in television tower selection, and in radar calibration,⁴² and as suburban delivery vehicles are other important functions.

Private Vehicles. One of the greatest potential uses of the small helicopter is as a private vehicle.⁵³ The biggest obstacle up until this point has been its high initial cost. It is hoped, however, that with mass production presently being stimulated through large military orders, the cost problem will be surmounted. Even now Hiller Helicopters, Inc., of Palo Alto, Calif., is prophesying with respect to its two-place, ram-jet powered *Hornet* weighing 356 pounds empty, that it should sell at a price of \$4,900 as soon as defense priorities are relaxed.⁵⁴ Visions of a helicopter in a few backyards may thus not be too far from reality.

Cost Considerations

It is important to note that neither the capital nor the operating costs of helicopters should generally be compared with those of fixed-wing airplanes. A com-

(Continued on page 156)

Beneficiation of Ores

by Nuclear Methods

Artificially Induced Radioactivity Is Being Investigated as a Means of Mineral Separation

By ANTOINE M. GAUDIN

FRANK E. SENFTLE

WILFRED L. FREYBERGER

AMONG the techniques for concentration of minerals, now being studied, is that of utilizing some of the nuclear properties of elements found in each mineral. Production of minerals in usable form, in general, requires their concentration, and because of cost requirements the methods used are nonchemical, that is, there are no bulk chemical reactions taking place. Thus, the physical properties of density, magnetic susceptibility, and electrical conductivity guide the basic principles of many varieties of gravity, magnetic, and electrostatic separators, respectively. Flotation, a very important method of separation, has its basis in the concepts of the physics and chemistry of surfaces.

Use of the nuclear properties of elements presents an interesting prospect to the mineral engineer. In particular, radioactivity is being investigated as a possible means of mineral separation. The basic idea is simple enough: if two different minerals are radioactive to different degrees, this difference may be detected and a mechanism triggered which will separate one mineral from the other. Some minerals, notably those of uranium, are naturally radioactive; in the case of the vast majority, however, it is necessary to make the minerals artificially radioactive.

In the earliest days of ore concentration, the only method of separating the valuable pieces of ore from the gangue was hand-picking. The human pickers made the separation on the basis of color, heft, and in some cases, texture. Although this method afforded a satisfactory beneficiation of the raw ore in these very early days, modern methods of mass production and more expensive economy could not tolerate such a slow and expensive procedure. Moreover, it has become ever more important to use the finer portions of the mined ore as well as the very large pieces. For these reasons, hand-picking of ores became unsatisfactory except in a few exceptional cases. The only way to resuscitate picking methods is to mechanize them for cheaper and faster operation. While this has been done to a large extent by various types of magnetic and electrical separators, the mining engineer is always on the watch for new methods and possibilities. Separation on the basis of radioactivity might prove an attractive possibility to supplement the existing methods.

The process might best be illustrated with a description of the Lapointe picker, the first practical instrument designed to separate radioactive minerals on the basis of their radioactivity. As designed by Christian Lapointe of the Canadian Bureau of Mines for

the concentration of uranium-bearing ores,¹ the device now in use at Port Hope and Port Radium, Canada, is shown in Fig. 1. The operation is as follows: A mixture of uranium-bearing mineral, the desired component, and other undesired gangue material is fed from a hopper, one piece at a time, to a belt. This train of mineral pieces is passed under a Geiger tube which measures the radioactive counting rate of each piece. The uranium-bearing minerals, being naturally radioactive, show a higher counting rate than the gangue minerals. The counting rate serves to determine whether the piece contains sufficient uranium. If the activity exceeds a predetermined lower limit, an electronic circuit is actuated which triggers a solenoid, and the piece under study at the time is knocked off the belt. The gangue material is collected at the end of the belt.

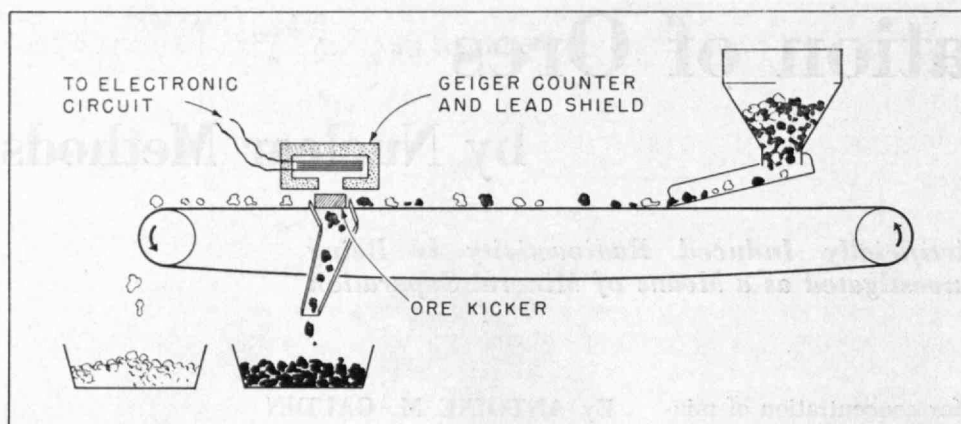
The above is a simple picture of the basic picking procedure. This idea was extended from naturally radioactive minerals to minerals made artificially radioactive by particle bombardment. The first such extension was to the concentration of beryllium-bearing minerals, particularly beryl.² Beryllium may be made to undergo a change in its structure if it is bombarded with x-rays of sufficient energy. Under proper conditions these x-rays will cause a neutron to be ejected from the nucleus, or core, of the beryllium atom. It is necessary that the x-rays, or gamma (γ) rays which are physically identical, have a minimum energy or threshold energy, of 1.7 million electron volts.³ This reaction is often abbreviated (γ, n) where

¹Kaufman, L. A., "The Radiogenic Concentration of Uranium Ores," *Transactions, Canadian Institute of Mining and Metallurgy*, LIII: 301 (1950).

²Gaudin, Antoine M., Dasher, John, Pannell, James H., Freyberger, Wilfred L., "Use of an Induced Nuclear Reaction for the Concentration of Beryl," *Transactions of the American Institute of Mining and Metallurgical Engineers*, 187:495 (April, 1950).

³To obtain an idea of the minuteness of the amount of energy represented by 1.7 million electron volts, it may suffice to state that it is the kinetic energy of a grain of sand weighing some three micrograms and moving at a speed of one centimeter per second.

On the other hand, the mass of an atom is so extremely small that if 1.7 million electron volts of energy were available for each atom, this would represent an enormous amount of energy.



M.I.T. Illustration Service

Schematic diagram of the Lapointe apparatus for concentrating uranium ores in which radioactive particles are automatically separated from undesired gangue by control systems sensitive to radiation. The same principles may be applied to minerals in which radioactivity is artificially induced.

γ represents the bombarding gamma ray and n the ejected neutron. What makes this transformation unique for beryllium is the value of the threshold energy. For most elements the threshold is about eight million electron volts. Beryllium has the lowest threshold of 1.7 million electron volts and deuterium, heavy hydrogen, has the next lowest, 2.2. Therefore, if beryllium minerals, together with other minerals, are irradiated with gamma or x-rays of proper energy, between 1.7 and 2.2 million electron volts, the beryllium compounds will eject neutrons and the rest of the material will remain inert. These neutrons, emitted immediately after irradiation, are counted and the procedure continues as with the Lapointe picker. This particular method is very selective, operating only for beryllium minerals, just as the Lapointe picker works only with naturally radioactive minerals.

The reverse of the (γ, n) nuclear reaction, the (n, γ) reaction,⁴ is universal instead of specific. Every element is affected to a varying degree when irradiated with slow neutrons such as exist in a nuclear reactor. Depending precisely on the amount of this variation, it is possible to separate certain minerals from certain others on the basis of the radioactivity produced by neutron irradiation.⁵

It is possible to calculate the activity which a pure compound would acquire under given conditions of irradiation.⁶ At a flux of the order of 10^9 n/cm^2 /second, these activities show a variation offering opportunity for separating minerals.

A second property of artificially radioactive elements is that each has a characteristic rate of decay, or half life. The half life is the length of time for the activity to drop to half its original value. Half lives are quite diverse, ranging from seconds to months. Thus another attribute lends itself to application in a separating process. For example, if pure minerals of

⁴The (n, γ) nuclear reaction is achieved by bombarding atoms with low energy neutrons. If a neutron is absorbed by the nucleus of the atom, an (n, γ) reaction may result. In the majority of cases, the new nucleus is itself radioactive, emitting positive or negative electrons, called beta (β) rays, and gamma rays.

⁵Senftle, Frank E., and Gaudin, Antoine M., "Concentration of Ores by Induced Activities," *Nucleonics*, No. 5, 8:53-59 (May, 1951).

⁶Senftle, Frank E., and Leavitt, William Z., "Activities Produced by Thermal Neutrons," *Nucleonics*, No. 5, 6:54 (May, 1950).

fluorine and manganese were irradiated together, they both would acquire high initial activities. The fluorine, however, would decay very rapidly and for all of its activity would disappear in several minutes. The manganese activity would remain for about one day, thus making the separation possible.

Minerals met in actual practice are not pure compounds as was tacitly assumed above. In general, the impurities encountered tend to make the initial activity of all minerals higher than the calculated values. Also, variations in the amount of impurity give the activities measured for various specimens of a given mineral an appreciable spread. This affects adversely the characteristic quality of the activity exhibited by minerals irradiated and aged under controlled conditions. Consequently the possible quality of separations is blurred. However, there still remain sufficient differences to make many selections.

The application of (n, γ) induced radioactivity to practical mineral separation hinges on several factors. At present a neutron source of sufficient strength at a reasonable cost is not available. In fact, the nuclear reactor and the cyclotron are the only existing sources of neutrons capable of producing the desired activities. Then, each ore body would represent a problem in itself and would require extensive study. Also, engineering problems are present. The most serious of these, from a production standpoint, is that the picker system in its present design can work on only one piece of ore at a time, making it difficult to process a large tonnage. This difficulty of working on one piece at a time is compounded by the problem of feeding irregularly shaped pieces of ore one by one. The size of the pieces fed to the picker is also important. The smaller the pieces into which the ore is crushed, the more one mineral will be released from the other parts of the ore matrix, leading to more efficient concentration. However, the picker operates more efficiently on large pieces. Thus, some compromise must be reached. These are some of the problems presented by practical application of radioactive picking. If the process can be extended from working on one piece at a time to a volume basis, one very important objection to the picking process would be overcome. However, the basic idea of separation by induced radioactivity now exists as a possible tool for future development in the mineral industry.

Speech and Communication Problems

Solved by Techniques of Visible Sound and Audible Light

By FRIEDRICH VILBIG

AUDIBLE sounds consist of vibrations (usually in air) having frequencies between the limits of about 20 and 20,000 cycles per second. This full range of frequencies is not necessary in speech, which can be produced intelligibly by frequencies lying within the band of from about 100 to 3,100 cycles per second. Sounds are usually complex and, instead of being composed of a single, pure tone, all frequencies between two limits may be present. Many sounds are composed of several frequency components of which the harmonics, or overtones, are integral multiples of the lowest, or fundamental, frequency. The characteristic sounds of instruments and voices are recognized by the frequencies which are present and their relative amplitudes.

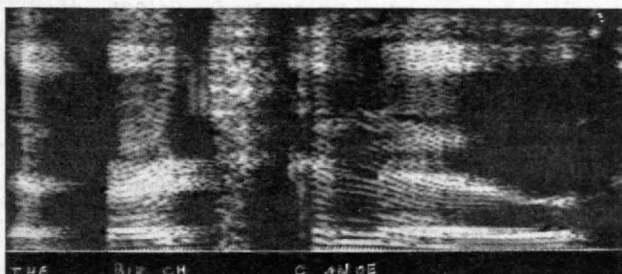
In speech, the vowel sounds are produced by modulation of the air stream passing over the vocal cords, which vibrate in such a way as to produce a relatively low fundamental frequency and a variety of harmonics. The amplitudes of the various harmonics, or overtones, will each be damped in a different way for each vowel, according to the different openings of the various cavities of the mouth organ. As a result, each vowel sound may be analyzed into discrete frequency components in a line spectrum.

Sounds of the consonants, on the other hand, are produced when air enters the oral cavities without exciting the vocal cords. The frequencies present are no longer integrally related and a continuous, or noise, type of spectrum is produced, which is unique for each consonant.

By analyzing the complex sounds of speech into their frequency components and recording these on film, the so-called visible speech films, a portion of which is illustrated in Fig. 1, are obtained. The speech may be analyzed by breaking up the sound spectrum into a large number of discrete frequency channels (through the use of suitable filters) and recording the energy in each narrow channel as a function of time, in bands across the width of the film. In this way, films like that of Fig. 1 are obtained. Such films are very important for linguistic purposes to show how the line and noise spectra change with different pronunciation; they are also highly useful for the development of special communication methods, such as devices for compressing and expanding speech frequencies to fit a specified communication channel. In order that the necessary data may be extracted from the visible speech films, however, a suitable playback mechanism is required.

An apparatus that makes it possible to replay speech films is shown in schematic form in the light dotted portion of Fig. 2. The visible speech film, shown as an endless belt, is passed in front of a lamp and housing which produce a narrow slit of light across the width

of the film. On the other side of the film is the light modulation disc, a light wave guide, and associated phototubes, amplifiers, and sound-converting units. Radiation from the light source penetrates the visible speech film where it is broken up into a large number of individual light beams by the band markings on the film. Having penetrated the film, the different light beams pass through a rotating modulation disc at different radial distances where they are modulated by opaque patterns on the transparent disc. The markings on the disc, one form of which is shown in Fig. 3, are such as to modify the light intensity of each beam at a rate which increases linearly with radial distance. If the modulated light beams are directed to the surface of a phototube with the aid of a light wave guide, such as is shown in Fig. 2, the phototube receives an optical signal corresponding to the original complex sound signal. The phototube converts this into an electrical signal which is amplified and made audible by the headset or a loud-speaker.



Official Photos, U.S. Air Force
Fig. 1. Section of a visible sound film portraying "the birch canoe." The vertical scale represents pitch.

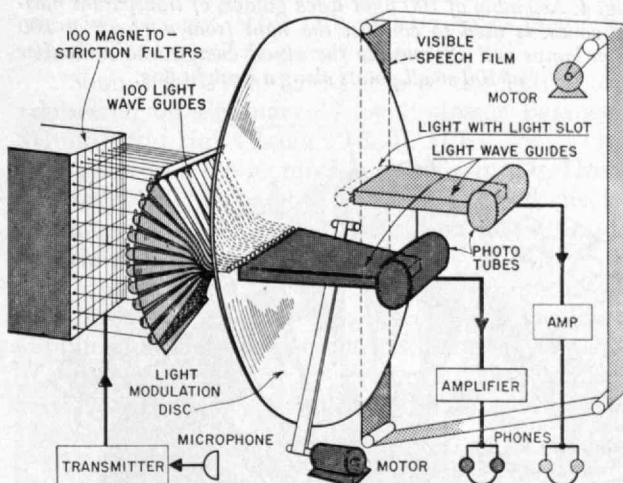


Fig. 2. Diagrammatic representation of mechanism for reproducing sound (light dotted portion). The heavy dotted portion represents apparatus for the instantaneous analysis, transmission, and synthesis of sounds.

The modulation disc supplies a wide range of frequencies (one for each light beam) and the intensity of light for each beam is determined by the markings on the visible speech film. The function of the modulation disc is to supply a wide range of frequencies throughout the speech spectrum, while the speech film alters the amplitude or intensity of the energy in each frequency channel. With correctly constructed modulation disc patterns and the proper rotational speed of disc, the variations of the light beams correspond exactly to those of the original sound recorded on the film. If the modulation disc runs at reduced speed, all the frequencies will be correspondingly diminished, and the pitch will be lowered. Conversely, the pitch will be raised, with expansion of the frequency band, if the speed of the disc is increased. The rapidity with which speech is spoken may be varied by changing the speed of travel of the visible speech film. If independent adjustments of the speed of travel of these two records are provided, the pitch, as well as the talking rate, may be modified.

The time delay required to produce the visible speech film can be a serious disadvantage when the equipment is used for communication purposes. However, by making use of the apparatus shown in the heavily dotted portion of Fig. 2, it is possible to adapt the equipment for the instantaneous transmission of speech, with or without pitch compression and expansion, but without change in the time scale or rate of talking. For this application, speech spoken into the microphone is converted into electrical wave forms by the transmitter. The electrical output of the transmitter is fed to a group of magnetostriction filters (100 in this case), each passing a band 30 cycles wide so that, for example, a channel of from 100 to 3,100 cycles per second may be analyzed. The output from each filter is connected to a small neon lamp. A certain pitch of the spoken speech passes through one filter and excites its associated neon lamp by an amount depending upon the intensity of the tone. The same is true for all other neon bulbs. With the help of the 100 light wave guides such as shown in Fig. 4, the light of the neon lamps is then concentrated to very

Fig. 4. Assembly of 100 light wave guides, of transparent plastic cones, is used to conduct the light from a group of 100 neon lamps and concentrate the visual energy into a number of 100 small points along a straight line.

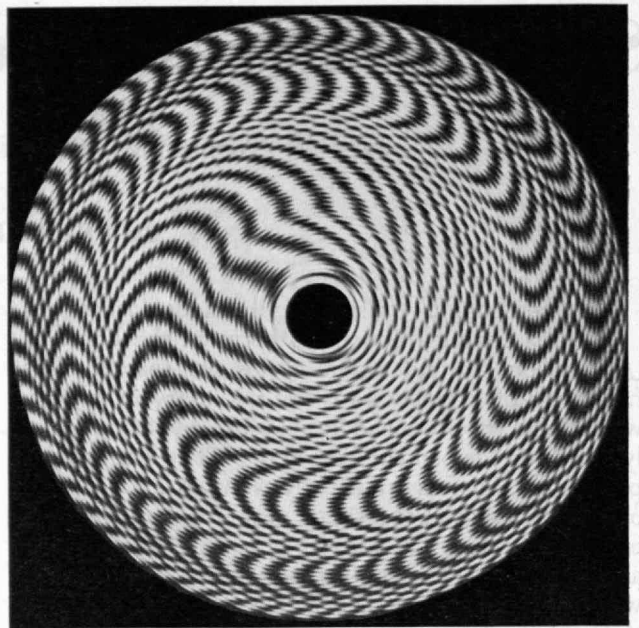
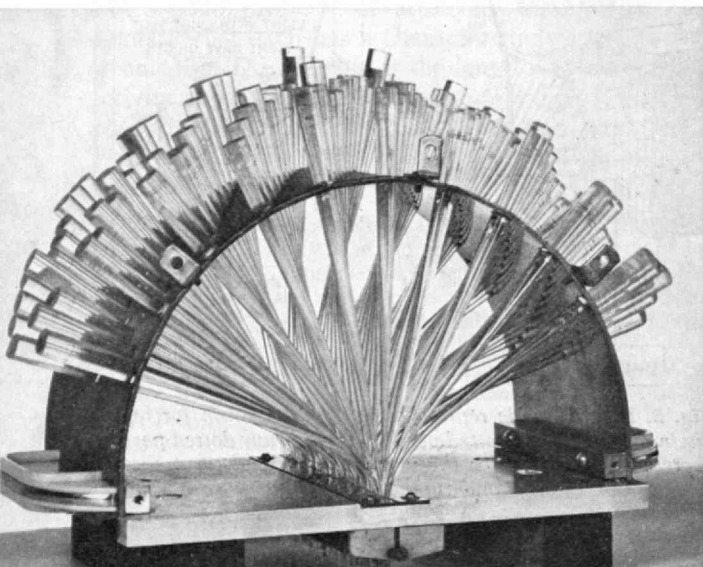


Fig. 3. One form of modulation disc, showing variations in intensity in multiwinding spiral bands.

small points along a radial line on the modulation disc. From this point on, the process of modulating the individual beams, feeding them to a phototube where they are combined, and converting the modulated light beams into sound, is the same as has already been outlined, except that speech input to the microphone can be instantaneously reconstructed. In this method, no provision is made for altering the rapidity of talking.

Frequency band compression and expansion is very valuable for communication purposes. It makes possible the transmission of signals in a reduced frequency band, and enables more messages to be transmitted in a given channel. If the signal is to sound natural, the frequency compression occurring during transmission must be undone by suitable expansion in the receiving equipment. Such compression-expansion may provide a better signal-to-noise ratio than is obtainable with ordinary transmission because atmospheric noise is decreased as the frequency band is diminished. Other possibilities appear when the compressed or expanded frequency band is stored on a tape recorder and played back with increased or reduced speed. Such change in the time scale is the acoustical analogue of the optical time compression or expansion of motion pictures. Time expansion and compression also have value for linguistic purposes and for facilitating translation of recorded speech.

Although the fundamental principles have been described in terms of speech synthesis and analysis, it is possible for the method to be applied to other types of signals as well. Accordingly, the technique is applicable not only to the analysis and synthesis of music, but also to the transmission of still or moving pictures as well.

The work outlined above is the result of research conducted at the Communications Laboratory of the Air Force Cambridge Research Center. Recently the author has presented a paper, "Instantaneous Frequency Band Multiplication, Division, and Analysis" before the Acoustical Society of America, in Chicago.

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

College Choice

ADMITTED to the Institute as freshmen last September were 43 students who were the progeny of fathers who had obtained their scientific and engineering training at M.I.T. Of these 43 registrants, out of a total freshman class numbering 744 students, two have the further distinction of representing the distaff side: Miss Franceline A. Cullen of Winchester, Mass., and Miss Margaret I. Hughes of Ojai, Calif.

The Institute extends its welcome to the following 43 undergraduates—the largest representation in this group since the 1948 registration:

Student	Parent
Stanley H. Barriger	John W. Barriger, 3d, '21
John W. Blake	Arthur H. Blake, '19
Peter B. Brand	Arthur B. Brand, '26
Peter C. Bulkley	Reginald W. Bulkley, '27 (deceased)
Robert F. Buntschuh	Henry C. Buntschuh, '28
Laurence H. Coffin, Jr.	Laurence H. Coffin, '27
Prentiss I. Cole, Jr.	Prentiss I. Cole, '27
Franceline A. Cullen	James A. Cullen, '28
Alan S. Dana, Jr.	Alan S. Dana, '15
James F. Duffy	James F. Duffy, '11
Henry B. du Pont, 3d	Henry B. du Pont, '23
James H. Eacker	Earl H. Eacker, '22
William E. Edgerton	Harold E. Edgerton, '27
George P. Edmonds, Jr.	George P. Edmonds, '26
John M. Farmer	Edward B. Farmer, '29
Horacio A. Garcia	H. Garcia Capurro, '26
Karl O. Gelotte	Ernest N. Gelotte, '23
Edward W. Gore, Jr.	Edward W. Gore, '18
Robert W. Gray, 3d	Robert W. Gray, Jr., '29
Philip E. Gruber, Jr.	Philip E. Gruber, '25
Richard E. Hewitson	Edward H. Hewitson, '25
Margaret I. Hughes	Walter S. Hughes, '14
Glenn D. Jackson, 3d	Glenn D. Jackson, Jr., '27
Edwin A. Jeffery	Clinton A. Jeffery, '26
Erskine R. Kelly	Erskine R. Kelly, '34 (deceased)
Myles J. Kiley	Albert J. Kiley, '21
William T. Kniesner, Jr.	William T. Kniesner, '16
Arthur LaCapria, Jr.	Arthur LaCapria, '32
Richard C. Lamb	Jennings C. Lamb, '30
Barron P. Lambert, Jr.	Barron P. Lambert, '26
Charles B. Lory	Marion R. Lory, '28
Thomas A. Marlow	Arthur B. Marlow, '29
Paul G. McHugh	Gerard E. McHugh, '30
Russell G. Meyerand, Jr.	Russell G. Meyerand, '25
John C. Pease	Harold C. Pease, '29
James W. Pratt, Jr.	James W. Pratt, '23
Joseph R. Saliba	George J. Saliba, '27
Roy M. Salzman	Milton G. Salzman, '25
Kenneth L. Shaw	Kenneth R. Shaw, '26 (deceased)
Charles R. Smith	Charles C. Smith, '27
Peter H. Tolman	Mayo Tolman, '13
	Ruth D. Tolman, '11
Philip A. Untersee	Maximilian Untersee, '19
Lennard Wharton	Nathaniel P. Wharton, '24 (deceased)

Day Medal to Buerger

THE Arthur L. Day Medal of the Geological Society of America has been awarded to Martin J. Buerger, '24, Professor of Mineralogy and Crystallography in the Department of Geology at the Institute, for "distinguished application of physics and chemistry to geology."

Associated with M.I.T. since 1925, Dr. Buerger has achieved a world-wide reputation for his developments of new techniques and instruments in x-ray experimentation and for application of x-rays to the study of crystalline solids. His achievements have been recognized by his election to the presidency of the Crystallographic Society in 1939, the Society of X-Ray and Electron Diffraction in 1943, and the Mineralogical Society of America in 1947.

In reviewing his wide applications of experimental knowledge and techniques to problems in mineralogy, petrology, and geochemistry, the citation, which was made by Harry H. Hess, Professor of Geology at Princeton University, lauded the large part Dr. Buerger has played in stimulating research in the new field of crystal chemistry and crystal structure in the geological sciences.

Popular Science Lectures

SCHEDULED to speak in the 1951-1952 series of the Popular Science Lectures, presented by the M.I.T. Society of Arts on Sundays at four o'clock in the afternoon, are: Professor Arthur T. Ippen of the Department of Civil and Sanitary Engineering; Leo L. Beranek, Associate Professor of Communications Engineering; and Professor John A. Hrones, '34, of the Department of Mechanical Engineering.

On January 20, Dr. Ippen, Professor of Hydraulics, will discuss "Experimental Hydromechanics in Engineering Design." This talk will be given in the new Hydrodynamics Laboratory (Building 48).

"Sounds and You" is the title of the lecture to be delivered on February 17 by Professor Beranek in Huntington Hall (Room 10-250), M.I.T.

Concluding the lectures in this group, Dr. Hrones, Professor of Mechanical Engineering, will speak in Huntington Hall, on "Automatic Control in Men and Machines."

Tickets for the Popular Science Lectures may be obtained a week before each lecture by mailing an application to the Society of Arts, Room 4-415, M.I.T., Cambridge. There is no charge but the Society of Arts requests that a stamped, self-addressed envelope be sent with the application.

The opening lecture had already been delivered when copy for this issue of The Review was being prepared. On December 9, 1951, Alex Bavelas, Associate Professor of Psychology, spoke on "Communication in Human Groups."

For Better Metallurgists

THE Visiting Committee on the Department of Metallurgy,* held a meeting at the Institute on April 23, 1951. Professor John Chipman, Head of the Department of Metallurgy, arranged a luncheon which was attended by most of the teaching staff and Thomas K. Sherwood,²⁴ Dean of Engineering. In addition to these meetings, the chairman spent some time at the Institute with Professor Chipman and certain heads of other Departments. It seemed difficult to arrange meetings when all members of the Committee could be present, but fortunately, most of the Committee members are quite familiar with Course III and are well acquainted with a number of the Department Heads.

Generally speaking, the Course appears to have been thoughtfully arranged as to subjects, the staff is made up of competent, earnest men, and the laboratories seem ample for research and the teaching of modern metallurgical practice.

The Committee recognized that in a course covering such a broad field as metallurgy, there is room for differences of opinion as to a curriculum, particularly as to the emphasis placed on certain subjects. Several members of the Committee who, since graduation, have spent many years in the practice of metallurgy, have advocated still greater emphasis on the basic sciences of chemistry (including organic chemistry) and physics, even though this might require less specialization and fewer options.

Those members present at the meetings expressed the hope that some means could be found to make greater use of some part of the long summer vacation, either in plant visits, plant employment, or in required courses of reading. The importance of the basic sciences and the advantages of summer work were recognized by the staff.

In meetings with the teaching staff, members of the Committee also stressed the importance of creating as close relations as possible with the metallurgical firms which have so generously contributed to M.I.T. It was pointed out that such contacts were most valuable to the Institute, the Faculty, and students.

Chemists Assemble

MEETING on March 4, 1951, the Visiting Committee on the Department of Chemistry† listened to a presentation of the Department's work and problems by Professor Arthur C. Cope, Head of the Chemistry Department, supplemented by Professor Leicester F. Hamilton,¹⁴ Executive Officer, and other members of the staff. Representing the Institute's Administration, Karl T. Compton, chairman of the M.I.T. Corporation, President Killian, Professor Julius A. Stratton,²³ Provost, and Professor George R. Harrison, Dean of Science, were also in attendance.

*Members of this Committee for 1950-1951 were: William C. Potter, '97, chairman, William S. Newell, '99, Louis S. Cates, '02, Augustus B. Kinzel, '21, Carl M. Loeb, Jr., '28, Robert M. Burns, and Herbert W. Graham.

†Members of this Committee for 1950-1951 were: Bradley Dewey, '09, chairman, Robert E. Wilson, '16, Pierre F. Lavedan, '20, William M. Stratford, '21, John M. Gaines, '26, Julian W. Hill, '28, and Ralph A. Beebe.

The morning was devoted to an orientation meeting, at which Dr. Cope described the preparations that had been made. His remarks were followed by a description of the make-up of the academic staff by Professor Hamilton, and talks on the status of the Graduate School by Professor Ernest H. Huntress,²⁰; the graduate curriculum and research program in inorganic chemistry by Professor Walter C. Schumb; the graduate curriculum and research program in nuclear chemistry by Professor Charles D. Coryell, the graduate curriculum in physical chemistry and the research program in physical chemistry by Professors Isadore Amdur and James A. Beattie,¹⁷; the graduate curriculum and the research program in organic chemistry by John D. Roberts and John C. Sheehan, Associate Professors of Chemistry; and the graduate curriculum and research program in analytical chemistry by David N. Hume, Associate Professor of Chemistry. Each of these talks was followed by a short informal question period.

After lunch, there were discussions on the needs of the Department, student guidance, the question of industrial contacts by the staff, and the percentage of students going into teaching as against industry, together with a discussion of plans for work in the field of organic biochemistry within the Chemistry Department. Highlighted by the statistics presented were the following points:

Two-thirds of the staff effort is devoted to undergraduate teaching. Since the Department has an average of about 35 students in each of the freshman, sophomore, junior, and senior classes, it is obvious that much of this effort is devoted to teaching chemistry as a service to other departments. After the teaching of a general Course in Chemistry to all freshmen, the major loads are in connection with the teaching of fundamental chemistry courses (analytical, physical, and organic chemistry) to chemical engineers, physicists, and other students in courses requiring these subjects.

The total of the Department's staff is 195, consisting of 30 full-time professors of various ranks, including Professors Emeriti Frederick G. Keyes and Gerhard Dietrichson (who are retired but active in research), aided by an instructor, fellows, research associates, teaching and research assistants, and clerical and other service aids.

Dr. Cope said that about half of the senior staff of the Institute had contacts with industry of one kind and another but that thesis subjects were not of an industrial nature. He felt that perhaps the greatest single need of the Department was for funds which would permit the payment of an additional \$20 a month to teaching and research assistants who put in 15 hours a week. They now receive \$110, in addition to their tuition at a rate of \$240 for each academic term. Professor Cope felt that if this increase were possible it would serve to reduce materially the 27 per cent (data based on 1950-1951) of all applicants who are accepted for graduate study but then withdraw their names, in many cases because of larger financial help from other institutions. The Committee felt that this was an important point which, especially

(Continued on page 152)

BUSINESS IN MOTION

To our Colleagues in American Business...

The Revere Technical Advisors call upon manufacturers from coast to coast, when requested to collaborate on special problems concerning the selection, fabrication or application of copper and copper alloys, and aluminum alloys. The procedure is this: the T.A. sits down with the customer or prospect, and together they study the project put before them by circumstances. It is a close collaboration, a joint effort that frequently results in marked improvement in quality or lessening of costs, or both. Here are some examples:

- Customer staking diamond inserts in free-cutting brass rod reported that the rod was turning color under the diamond, resulting

in rejects. The brass was machined with a water-soluble oil, and cleaned with a special preparation. It was discovered that parts machined with sulphur-bearing oils were being cleaned in same container. This was the cause, and the obvious remedy eliminated discolor.

- Plumbing goods manufacturer was puzzled by the fact that brass tube purchased in small grain sizes for good plating qualities was giving both bending and plating troubles. Inspection of the processes of the manufacturer showed that the tube was being annealed with a torch before expansion and plating. This annealing resulted in a large grain size of .250 mm., as shown by a typical sample sent to the Revere Laboratory. Thus the apparent anomaly was explained, and close control of annealing was established to keep grain size within the necessary limits for satisfactory plating.

- An electrical manufacturer was using a very

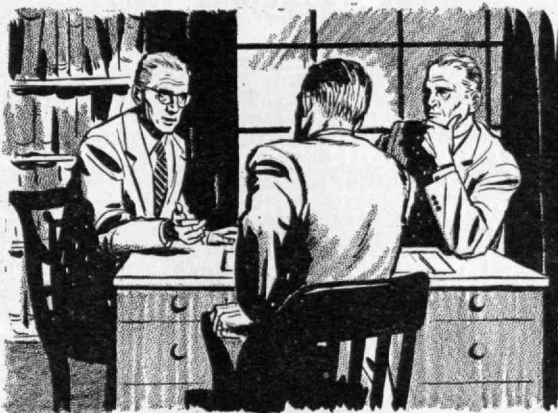
special and expensive copper alloy as a liner for a plunger housing. He felt this extremely hard alloy was necessitated by the large amount of wear on the part. Revere suggested that Herculoy, a silicon bronze, would be worth trying in hard temper. Tests were made, and the Revere alloy was found completely satisfactory. Substitution provides a metal that is more easily available, and at the same time costs less than the original.

- A maker of a timing device was having trouble blanking cleanly a small gear part. Detail was so fine and ratio of tooth height to width so great that leaded brass had a tendency not to form full teeth. A

study of this problem brought forth the suggestion that a more ductile metal was needed, namely, $\frac{3}{4}$ hard cartridge brass. This worked beautifully when tried, and customer is extremely pleased with the tremendous reduction in rejects of this difficult part.

These are just a few of a number of cases that went into the "closed" file during a

single month. Almost every other supplier to industry today does much the same sort of work with his customers. He feels it is not only a fine way to build good will, but also a part of his obligation to the customers who have helped him grow. It is a fact, of course, that every dollar you pay, whether for chemicals or metals, glass, cements, papers, carries a small charge for the research and know-how and skill required to make fine products. Your suppliers have knowledge you have helped pay for — why not use it as well as their materials? The results may be as pleasing as those in the four instances just cited.



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THE INSTITUTE GAZETTE

(Continued from page 150)

in these times of high costs, should be given consideration and emphasis.

Most of the Department's graduate students are candidates for the doctor's degree, and of these, 90 per cent go into industry. Dr. Cope said that he felt the Department would be stronger if there were more space and a little more money for the appointment of post-doctoral research fellows. He believed also that if space were available, industry would probably finance many of these post-doctoral research fellowships. In presenting these points, Dr. Cope emphasized the good inspirational relationships incident to having these men working within the Department and the good public relations built up by them as they went out into positions of leadership in the profession.

There was a full discussion of the question of the desirability, in the case of the Chemistry Department, of the Institute rule that a graduate student's minor field must be outside the Department. It was pointed out that this precluded the possibility of men who are majoring for a doctor's degree in organic chemistry taking physical chemistry or analytical chemistry as their minor, and of those majoring in the latter fields taking organic chemistry or one of the other subjects as a minor. It was the feeling of the Committee that as a general rule this was probably wise, but

it recommended that appropriate Institute authorities provide for exceptions to the general rule in the case of Course V graduate students who are found by the dean of the Graduate School to have studied a reasonably wide variety of subjects during their work for their undergraduate or master's degree. The Committee was of the opinion that this was necessary to insure the obtaining of scholars who insist upon such an education; that the various fields of chemistry are today fully as widely separated from each other as the fields of some departments are separated from those of others.

It was pointed out that while the Department of Biology plans to have a full professor of biochemistry there was a real need within the Chemistry Department for a specialist in the organic chemistry side of biochemistry. This was agreed to by the Administration, but the general consensus was that because of the present age distribution of the staff — 11 professors being from 55 to 65, with six to retire by June 30, 1957 — it might be best to find a young, alert biochemist who would come in on a nonpermanent tenure basis and prove his ability before promotion to one of the positions that will become available through automatic retirement. The Committee made no definite recommendations on this policy, but it was their feeling that the Department should have a good biochemist.

There was some discussion of the amount of student guidance conducted by the Department. Apparently,

(Continued on page 154)



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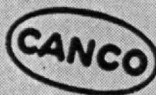
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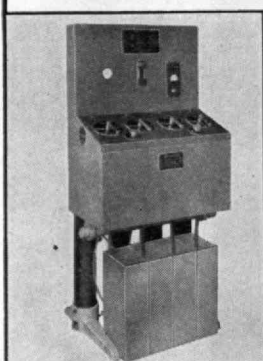


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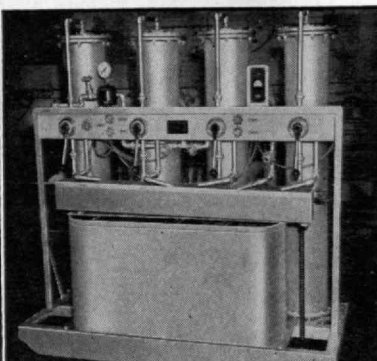
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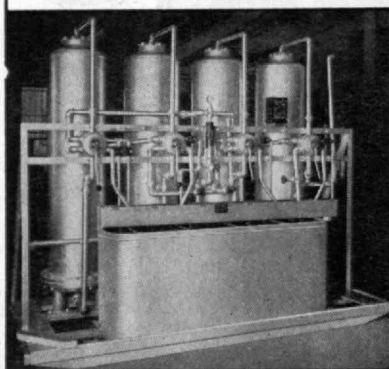
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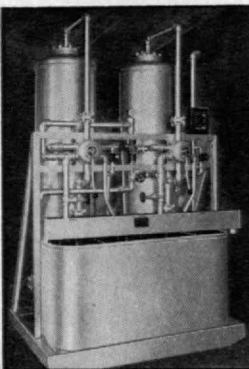
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THE INSTITUTE GAZETTE (Continued from page 152)

a minimum is carried out, and little attempt is made to discuss with students the wisdom or validity of their choice of chemistry as their life's profession. It is interesting to note that normally half of the undergraduate students take graduate work upon receiving their bachelor's degree, and that approximately 8 per cent of the present candidates for doctor's degrees are graduates of M.I.T. The Chemistry Department has, since the first doctor's degree was granted in 1908, graduated almost twice as many doctor's candidates as any other department; and of all doctor's degrees awarded, 69 per cent are in the fields covered by the Departments of Chemistry, Physics, Chemical Engineering, and Metallurgy.

The Committee was advised that the Institute's plant is being increasingly used by the Chemistry, as well as other Departments, during the summer months and was favorably impressed by the Summer School activities in modern analytical techniques, such as those using optical and electrical methods and the infrared photo-spectrometer. It was also advised that an increasing number of graduate students work all summer on their research.

There was a great deal of discussion as to whether work in analytical chemistry required the same high type of scientific ability as that in physical and organic chemistry. While one member of the Committee was inclined to look upon some of this work as a little more akin to a technology than a science, the feeling of the other members was that the solving of analytical problems in research setting is a research problem in itself. It was felt that this work should be used as a type of research to bring about an understanding of now unknown phenomena relatively insoluble by older, more classical methods of analytical chemistry. To that end, care should be taken to train in this field only topflight men of imagination, breadth of view and interest. It was felt that with proper leadership by professors of the type now working in the field, this kind of work would increase the flow of new knowledge in all fields of chemistry, and that it should be easy, in such a setting, to avoid the danger of turning out only high-grade technicians rather than true scientists.

The financial needs of the Department appear to be of a reasonably moderate nature. Professor Cope emphasized that all but approximately 12 per cent of the total budget was for fixed salary commitments. This percentage represents the total amount available for hiring teaching assistants and purchasing supplies and equipment. He pointed out that if \$25,000 more a year were available for higher payments to teaching assistants, the Institute would undoubtedly be able to attract to its Chemistry Department some top-grade graduate students who now go elsewhere because of opportunities for higher pay for that portion of their time which is devoted to the very important function of teaching.

(Concluded on page 156)

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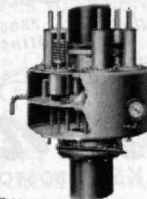
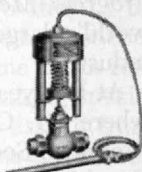
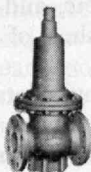
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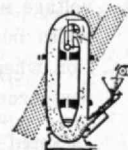
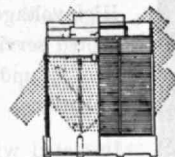
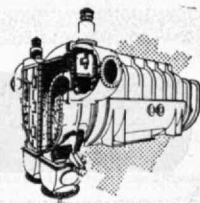
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THE INSTITUTE GAZETTE

(Concluded from page 154)

A.S.M. President

PROFESSOR JOHN CHIPMAN, Head of the Department of Metallurgy at the Institute, has been elected president of the American Society for Metals, the largest group of metal engineers in the world. Dr. Chipman, who came to M.I.T. as professor of metallurgy in 1937 and has been in charge of the Department since 1946, has previously served the American Society for Metals as a director (1946-1948) and as vice-president (1950-1951).

In serving as president for the more than 20,000 members of the American Society for Metals, Dr. Chipman will be head of the only engineering society devoted exclusively to the metal industry. Although the Society sponsors many professional and educational activities, it is probably best known for its publications which include the *Metals Handbook*, *Metal Progress*, *Metals Review*, and *Transactions*. It is the world's largest publisher of books for the metal industry.

At this year's National Metal Congress in Detroit, where Dr. Chipman's election was announced, the American Society for Metals sponsored both its National Metal Exposition, the largest annual industrial exposition in America, and the first World Metallurgical Congress, which was attended by more than 600 leading metal scientists from the free world. At this congress, the Society presented the first complete survey and study of the metal resources of the world.

THE SMALL HELICOPTER

(Continued from page 142)

parison of costs has significance only where the functions performed are comparable. Many of the services performed by the helicopter were never performed before by any vehicle. In such cases, costs should either be compared to the aggregate of costs for substitute services used before the advent of the helicopter or should be assessed against the value of the services if the function had no predecessor. In geological service work, forest-fire fighting, power-line patrol, and oil and mineral exploration, the helicopter in part replaces less efficient methods of performing inferior service. In rendering a general traffic carriage service in the lower levels of the air space above highly congested metropolitan areas, the helicopter may be said to be replacing, to some extent, services rendered by the train, street car, subway, and truck; although in a very substantial sense, it is rendering an entirely new service that will attract new business which didn't move before at all. In many of these cases it would obviously be inaccurate to compare the helicopter's operating costs, for example, to the per mile operating cost of a fixed-wing airplane which could not in any event perform the function. Furthermore, in thinking realistically about operating costs, it is necessary to keep in mind that both the original capital cost and the operating cost of helicopters will

be reduced, in accordance with the experience gained in connection with the development of all other new inventions, as further development and mass-production techniques are applied. With this in mind, it is a perfectly safe prediction today that the intrinsic value of services performed by the small helicopters (which should be the ultimate test of their economic feasibility) will shortly result in their substantially extended use in many fields of commercial activity.

Military Uses of the Small Helicopter

Lack of space prohibits an exhaustive study of the most thrilling and dramatic episode in the helicopter's development — the use of the small helicopter in the Korean War. Not only is the place of the small helicopter in all branches of the military services now firmly assured, but the experience gained in its use has pointed up the tremendous potential of the large, transport-size helicopters in military service, as will be developed later in Part II of this article.

To the Coast Guard and the Marine Corps belongs the credit of first seeing some of the most advantageous uses for the helicopter. The activities of the Coast Guard in the field have already been touched upon above. Several years ago, the Marine Corps realized that in the helicopter it had something special, and began with imagination to develop assault transport techniques and many other uses for it. Both the Marine Corps and the Navy discovered the value of the helicopter as an instrument to effect air-sea res-

cues from carriers. The Navy further recognized its value in speeding up the distribution of sealed-secret orders and of personnel to different ships of the fleet on maneuvers and in antisubmarine detection. For several years the Department of the Army has been moving in the direction of having each division supplied with a helicopter liaison facility. The Air Force also incorporated several small helicopters into its Air Rescue Service which saw service in lifesaving work, particularly in Alaska.

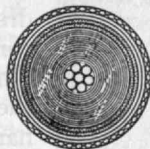
Thus, by the time of the Korean War,⁵⁵⁻⁶⁰ all of the military services had, to varying degrees, utilized the helicopter. Within an astonishingly short period, however, as so often happens in America with a new invention, its acceptance caught on like wildfire and everybody wanted one.

The helicopters which were stationed on the larger carriers and on some of the cruisers and battleships in the Far East quickly proved their value. Pilots crashing near carriers were rescued in a matter of minutes. The value of the helicopters, as spotters for shore bombardment, greatly improved fire power accuracy. Their use in spotting and in destroying floating and fixed mines also was discovered through the Korean experience.

Both the Marine Corps and the Air Force put helicopters into Korea proper shortly after hostilities commenced. Their lifesaving performance dramatically revealed their value. By January, 1951, a very few helicopters were credited with saving nearly 3,000

(Continued on page 158)

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All of these cables, although having the same type of insulation, have various types of outer coverings to be suitable for the various types of service conditions. These coverings are identified in the type number as a suffix.

The suffix "GV" refers to a teflon tape and treated fiberglass outer covering which can be rated at 400°F, the same as the insulation. The suffix "GGV" is the same except a heavy-duty braiding for improved abrasion resistance.

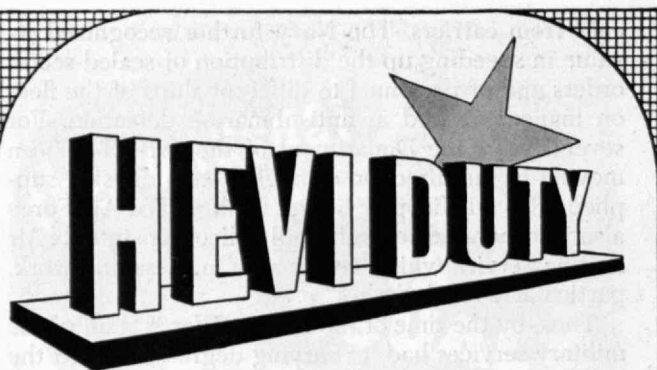
The suffix "RS" is a neoprene sheath compounded for flexibility; temperatures from -50°F to 250°F; flame and oil resistant.

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COX-3FS-011-GL or NL	.011" cw	.090	5	6	24	70	.16	Flexible
COX-4FS-011-GL or NL	.011" cw	.125	7	9	17	93	.21	Cables
COX-2FS-22-NL	#22 str.	.125	10	14	30	50	.16	Small
COX-2FS-22-RS	#22 str.	.170	10	25	30	50	.18	diameter
COX-2FS-22-GV	#22 str.	.135	10	18	30	50	.25	flexible
COX-2FS-22-GGV	#22 str.	.150	10	20	30	50	.28	cables
COX-3FS-22-GL or NL	#22 str.	.170	13	20	20	73	.25	Smaller than 59/U
COX-3FS-22-GGV	#22 str. cw	.195	13	30	20	73	.60	Size of 58A/U
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COX-3FS-026-RS	.026" cw	.250	13	45	20	73	.80	Equal to 59/U
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THE SMALL HELICOPTER

(Continued from page 157)

lives, particularly in carrying wounded men (frequently picked up behind enemy lines) directly to hospitals in situations where it is clear that they could not have survived the rough ambulance trip. Indeed, blood transfusions and other medical aid were often rendered in flight.

Other general uses of the helicopter in combat as a transportation vehicle were soon revealed, too. It became the "Army mule" for short-range transportation of men, messages, and supplies — particularly to otherwise inaccessible areas. Its value was proved in reconnaissance, liaison work, visual-flank security, the posting and supply of security detachments, and the movement of security patrols from one key locality to the next. Early in World War II, the Germans used helicopters in winter maneuvers to place field artillery in mountain positions and to supply these posts with ammunition and hot food.⁴²

It is no wonder, therefore, that Major General Merwin H. Silverthorn, Acting Commandant of the Marine Corps, before the House Armed Services Committee, could say: "There are no superlatives adequate to describe the general reaction to the helicopter." The boosted morale of the fighting troops caused by the helicopter was tremendous. As one pilot put it: "Every kid down there knows that no matter what happens, we will get him out if he gets hit."⁵⁵⁻⁶⁰

In the light of the tremendous demand in Korea for helicopters, and of the widespread publicity given to their uses, there is a popular conception that hundreds are, and have been, flying in Korea. Any such conceptions are very grossly exaggerated. Indeed, the Marines started off there with five Sikorsky S-51's and there never have been, up until just recently, but a handful of helicopters available for flying duty in the area. It is because of their great and dramatic versatility, and the fact that each one is so busy doing so much good, that it seems there must be more than was actually the case.

One hears frequent concern about the vulnerability of the helicopter in combat areas. Actually this is a misplaced fear. It would be safe to venture the guess that most assault troops would rather be landed by helicopter than by glider or parachute. Furthermore, as was pointed out by Major General Silverthorn, most of the action of the helicopter in Korea,

§ The helicopter's ability to rise vertically, suddenly, and to retire to cover, gives it a jack-in-the-box type of advantage.

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for example, has been behind ridges in rear areas where it was relatively safe from air attack. He also pointed out that if the enemy had enough aircraft to wipe out the helicopters, the ground forces might as well go home too. Indeed the relatively slow helicopter with its quick maneuverability, coupled with its capacity to go from side to side, or hover, can frustrate the attempt of a fast airplane, particularly a jet, to get its sights on the helicopter. As indicated above, the helicopter, like an individual, can easily, and does, take advantage of terrain obstructions.⁴²

Although some of the potential uses of the larger helicopters in military services will be discussed in Part II of this article, it is clear that there will be an ever-increasing need by all of the military services for the smaller models. Following the tremendous acceptance of the helicopter by all the military services after the Korean experience, large orders have already been placed by the military services for smaller helicopters.

It is impossible at this time to predict as to whether more helicopters in the next 20 years will be used commercially or in the military services. This depends upon the size and activities of our armed services. The significant point is that the multiple uses for the helicopter are as great in military services as they are anywhere else. This is due to the fact that up to now and basically, it is a transportation vehicle — not a tactical fighting weapon. This points to the fact, applicable not only to the small helicopters discussed above but also to the large transport-type helicopters covered in Part II of this article, that its superior performance characteristics will make it necessary for the helicopter to be available to all branches of the military services at all levels just as jeeps, busses, trucks, and ambulances must be available at all levels. No one can have a corner on the helicopter in so far as services are concerned, because its tremendously useful operating characteristics have in a sense dedicated it to the general use.

The author wishes to acknowledge with thanks the valuable services of Brackley Shaw, and of James F. Bell in the preparation of this article. The conclusion of this article, Part II, is scheduled to appear in the February, 1952, issue of The Review.

REFERENCES

- ¹ Interesting surveys of the development of the helicopter are: Liptrot, Group Captain R. N., "Historical De-
(Continued on page 160)

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THE SMALL HELICOPTER

(Continued from page 159)

velopment of Helicopters," *American Helicopter*, V:12, No. 111 (February, 1947); V:12, No. IV (March, 1947).

² Maculey, Clinton B. F., *The Helicopters Are Coming*, Chapter III (New York: McGraw-Hill Book Company, Inc. [Whittlesey House], 1944), \$2.00. The historical information contained in this article is largely based on the excellent surveys as given in this reference and No. 1 above.

³ "Selected Helicopter Chronology," *Aero Digest*, 62:81, No. 2 (February, 1951).

⁴ Liptrot, *opus cited*, V:12, No. IV.

⁵ An interesting discussion of the development of the helicopter industry, manufacturing and operational, is to be found in "Up with the Helicopter," *Fortune* XLIII:91, No. 5 (May, 1951).

⁶ For a discussion of some of the technical problems raised in the development of the helicopter, see "Helicopter design," *Aero Digest*, 62:76, No. 2 (February, 1951).

⁷ Stepniewski, W. J., *Introduction to Helicopter Aerodynamics*, Volume I, *Performance* (Morton, Pa.: Rotocraft Publishing Company, 1950), \$2.00.

^{7a} Nikolsky, Alexander A., *Helicopter Analysis* (New York: John Wiley and Sons, Inc., 1951), \$8.00.

⁸ Piasecki, F. N., *Engineering Problems of the Helicopter* (New York: Society of Automotive Engineers, Inc., December, 1947), \$.50.

⁹ *Proceedings of the Seventh Annual Forum of the American Helicopter Society in Cooperation with the Institute of Aeronautical Sciences*, April 26, 27, 1951 (New York: Institute of the Aeronautical Sciences), \$.50.

¹⁰ Interesting discussions of the fundamental principles of helicopter operations can be found in Laskowitz, I. B., "Helicopters: Their History, Development, Construction, Operation and Future," *Municipal Engineers Journal*, 35:105 (Fourth Quarterly Issue, 1949).

¹¹ Fay, J. S., "Some Present and Future Aspects of Helicopter Piloting," *American Helicopter*, XIII:6, No. 7 (June, 1951); XXIII:8, No. 8 (June, 1951).

¹² For the most recent compilation of the configurations of the leading small helicopters with photographs, see: *Aero Digest*, 62:54-74, No. 3 (March, 1951), and

¹³ *Aviation Week*, 54:84, 85, No. 9 (February 26, 1951).

¹⁴ For a limited discussion of the development of the small helicopter design and production in England which, perhaps because of World War II, has not proceeded at the same pace as in this country, see the interesting report of the Interdepartmental Helicopter Committee, appointed by the Minister of Civil Aviation, fully digested in *Aviation Week*, 54:21, No. 15 (April 9, 1951).

¹⁵ An exhaustive study of the agricultural potential of the helicopter is contained in a survey entitled "Bell Utility

(Continued on page 162)

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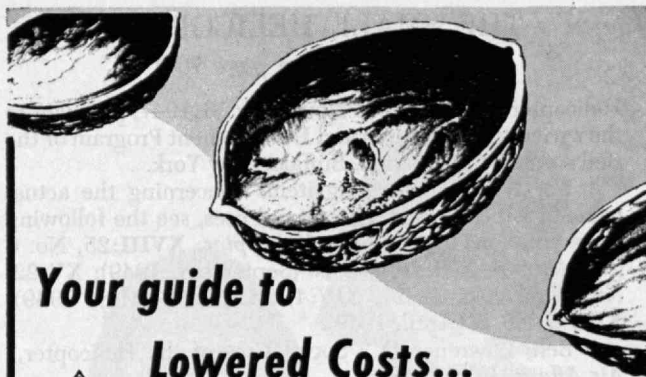
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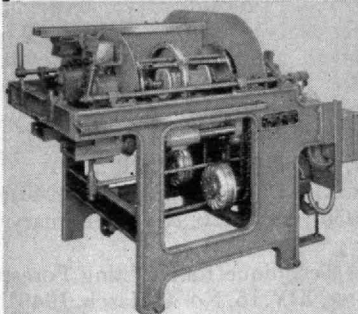
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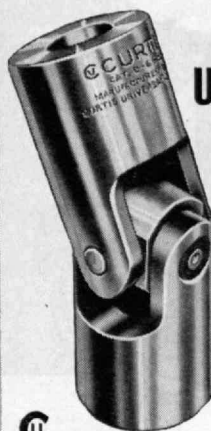
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(Continued from page 160)

Helicopter" completed on November 26, 1947, pursuant to the agricultural Research and Development Program of the Bell Aircraft Corporation, Buffalo, New York.

¹⁶ For typical interesting items concerning the actual value of helicopters in agricultural uses, see the following news notations in *American Helicopter*: XVIII:25, No. 6 (May, 1950); XVI:26, No. 10 (September, 1949); XV:22, No. 9 (August, 1949); XIV:4, 24, No. 6 (May, 1949); XIV: 6, No. 5 (April, 1949).

¹⁷ Bell, Lawrence D., "Social Uses of the Helicopter," *Air Affairs*, July, 1948.

¹⁸ Johnson, William G., "Air Patrol of Power Lines," *American Helicopter*, XXI:9, No. 3 (February, 1951).

¹⁹ Murphy, John A., "Flying Patrolmen," *American Helicopter*, XV:11, No. 9 (August, 1949).

²⁰ *American Helicopter*, VIII:4, 25, No. 4 (March, 1950); XVIII:23, 24, No. 6 (May, 1950); XIV:11, 24, No. 5 (April, 1949); XVI:21, No. 10 (September, 1949).

²¹ A detailed description of such a survey can be found in "Operation Statistics for First Oil Survey," *American Helicopter*, XIV:11, No. 6 (May, 1949).

²² *Aviation Week*, 52:101, No. 9 (February 27, 1950).

²³ *American Helicopter*, XIV:23, No. 5 (April, 1949).

²⁴ *American Helicopter*, XIV:23, 26, No. 5 (April, 1949); XVIII:21, No. 6 (May, 1950); XVIII:26, No. 3 (February, 1950).

²⁵ Jenkins, Starr, "New Technique for Fighting Forest Fires," *American Helicopter*, XIV:15, No. 4 (March, 1949).

²⁶ Jefferson, Frank J., "The Helicopter — A New Factor in Fire Control," *Fire Control Notes* (official periodical of the Forest Service, U. S. Department of Agriculture), January, 1948.

²⁷ See Reports of American Congress on Mapping and Surveying, June 8 through June 10, 1949, containing addresses by Colonel Fremont S. Tandy, Director of the Inter-American Geodetic Survey, and E. J. Fennell, Chief of Plans and Estimates Section of the U. S. Geological Survey, Department of Interior.

²⁸ *American Helicopter*, April, 1949, page 22.

²⁹ Gustafson, E. E., "Use of Helicopter in Surveying and Mapping," *American Helicopter*, Volume XV, No. 7 (July, 1949).

³⁰ *American Helicopter*, XVIII:3, No. 6 (May, 1950).

³¹ Brennert, H. E., "New York City's Air Police," *American Helicopter*, XVII:17, No. 2 (January, 1950).

³² Treasury and Post Office Departments Appropriations, 1952, Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, 82d Congress, First Session, page 619 (May 1, 1951).

³³ *American Aviation*, January 8, 1951, page 36.

³⁴ Wigdortchik, "Some Lessons of the Liverpool-Cardiff

(Continued on page 164)

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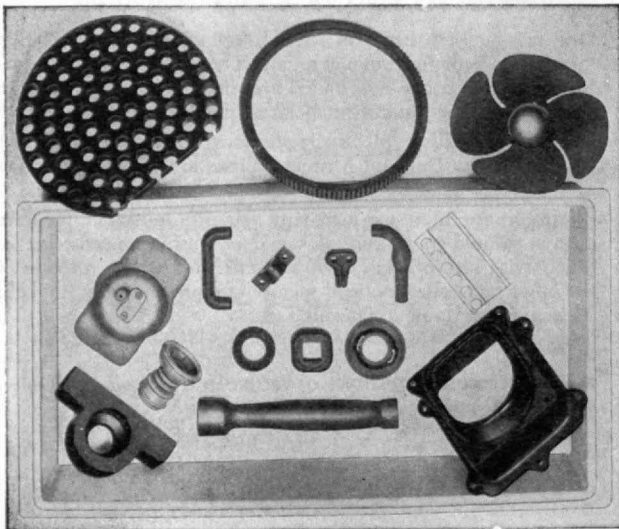
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Helicopter Passenger Service," *American Helicopter*, XXII:11, No. 6 (May, 1951); XXIII:12, No. 7 (April, 1951); XXIII:14, No. 8 (July, 1951).

³⁵ *American Aviation*, 14:35, No. 27 (January 22, 1951).

³⁶ "Report on Civil Helicopter Developments in the United Kingdom," prepared by L. W. McHenry, Office of the Civil Air Attaché in the American Embassy in London, June 9, 1950.

³⁷ *American Helicopter*, XVIII:9, 26, No. 4 (February, 1950); XIV:4, No. 6 (May, 1949).

³⁸ *American Helicopter*, XIV:24, No. 6 (May, 1949).

³⁹ Berry, M., "Hiller 360 Goes Whaling," *American Helicopter*, XXIII:6, No. 8 (July, 1951).

⁴⁰ *American Helicopter*, XVI:3, No. 10 (September, 1949).

⁴¹ *American Helicopter*, XVI:3, No. 10 September, 1949; XX:17, No. 12 (November, 1950).

⁴² Piasecki, F. A., "Military Aspects of the Transport Helicopter," presented before the joint meeting of the Ottawa Aeronautical Society, The Institute of the Aeronautical Sciences, and the Engineering Institute of Canada, October 30, 1950.

⁴³ *American Helicopter*, XXIII:21, No. 7 (June, 1951).

⁴⁴ The officials of the Port of New York Authority have found that the use of a helicopter (which it owns) has saved a tremendous amount of time on its inspection trips. — *New York Herald Tribune*, May 31, 1951.

⁴⁵ W. E. Reynolds, Public Buildings Administrator, testified before the Senate Public Works Sub-Committee that the use of helicopters to transport key federal officials and couriers from one dispersal point to another around Washington was presently being foreseen. — *Washington Daily News*, page 3, December 14, 1950.

⁴⁶ The helicopter has also received use by political campaigners, see *American Helicopter*, XVIII:4, No. 4 (March, 1950).

(Concluded on page 166)

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(Concluded from page 164)

⁴⁷ *American Aviation Daily*, 72:4, No. 1 (January 2, 1951).

⁴⁸ Ager, Carl C., "Dam Construction at an Isolated Location," *American Helicopter*, XIX:11, No. 8 (July, 1950).

⁴⁹ *American Helicopter*, XV:25, No. 9 (August, 1949).

⁵⁰ The helicopter is also being increasingly utilized by movie studios. See *American Helicopter*, XIX:23, No. 8 (July, 1950).

⁵¹ *American Helicopter*, XIV:24, No. 5 (March, 1949); XVIII:4, No. 4 (March, 1950).

⁵² *American Helicopter*, XIV:24, No. 6 (May, 1949).

⁵³ For a discussion of some legal problems raised by the increasing use of the helicopter, see Pogue, L. W., "Helicopters and the Changes which They Require in Aviation Law," *Journal of Air Law and Commerce*, 14:300, No. 3 (Summer, 1947).

⁵⁴ Perreault, W. D., "Hiller Hornet — Low Cost Backyard 'Copter," *American Aviation*, 14:23, No. 33 (March 5, 1951).

⁵⁵ For a full discussion of the use of the helicopter in Korea up to date, see, Worden, W. L., "The War's Craziest Contraption," *Saturday Evening Post*, 223:26, No. 25 (December 16, 1950).

⁵⁶ Winchester, J. H., "Helicopters at War." *Aviation Age*, 15:20, No. 1 (January, 1951).

⁵⁷ "Mercy Is His Business," *Bee-Hive* [United Aircraft Corporation], XXVI:10, No. 1 (January, 1951).

⁵⁸ *The Sikorsky News*, 3:1, No. 5 (February 9, 1951; 3:1, No. 8 (May 11, 1951).

⁵⁹ Mashman, Joseph, "Marine Helicopters in Korea," *American Helicopter*, XXII:8, No. 6 (May, 1951).

⁶⁰ It is also interesting to note that the helicopter is seeing service in Malay in Britain's guerrilla warfare against the Communists. This helicopter is the Sikorsky S-51 built in England under a license agreement with Westland Aircraft, Ltd. Westland had produced over 40 of these craft by the end of 1950, most of which are flown by the Royal Air Force, although some have been utilized in Africa in spraying operations. *American Helicopter*, 3:1, No. 3 (December 15, 1950).

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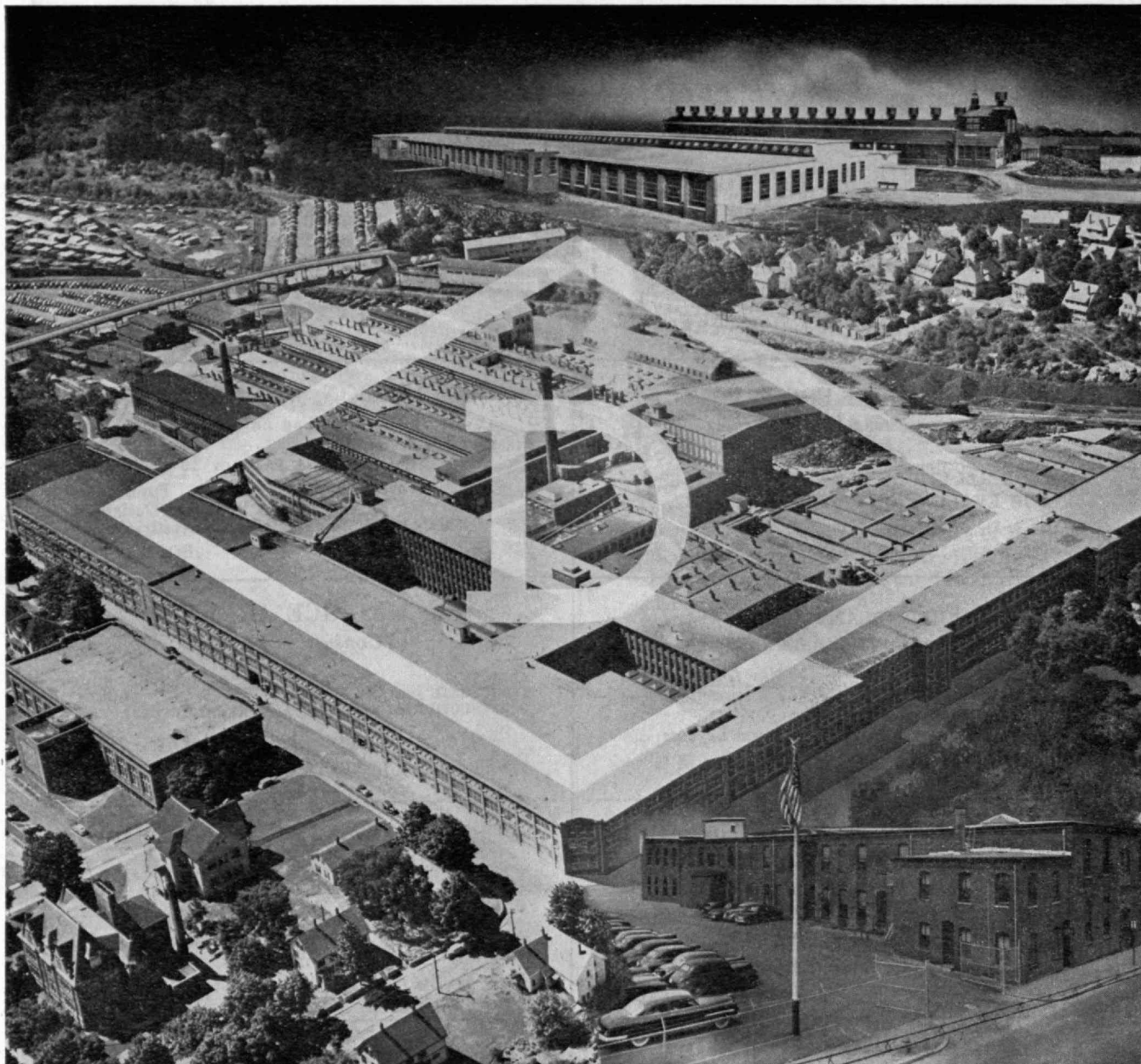
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Alumni AND Officers IN THE News

We Note with Pride that . . .

ROBERT T. HASLAM'11, CRAWFORD H. GREENEWALT'22 and JAMES R. KILLIAN, JR., '26, are among 10 men in the nation who will serve as advisers to the Secretary of the Army and Chief of Staff, as members of the Army's scientific advisory panel.

President Truman has appointed ROGER L. PUTNAM'17, manufacturer and former mayor of Springfield, Mass., as administrator of the Economic Stabilization Agency, effective December 1, 1951. Mr. Putnam took over as chief of the government's anti-inflation campaign upon the resignation of Eric A. Johnston.

The appointment of WILLIAM WYER '18, consulting engineer and railroad operation expert, as the new trustee of the Long Island Railroad, was announced early in November by Judge Harold M. Kennedy of the United States District Court in Brooklyn, N. Y.

G. FRANK LORD'21 has been elected first vice-president of the Massachusetts Association of Insurance Agents.

FREDERICK S. BLACKALL, JR., '22, president of the Taft-Peirce Manufacturing Company of Woonsocket, R.I., has been elected president of the National Machine Tool Builders' Association, as announced at the ninth annual meeting of the association in November.

On November 5, the Navy announced the appointment of Rear Admiral ROY T. COWDREY'23 as commander of the New York Naval Shipyard in Brooklyn, N. Y. Admiral Cowdrey has won the Legion of Merit medal twice for outstanding work in World War II.

BERNARD LEWIS'23, internationally-known chemist, has been named director of powder and explosives research for the Army Ordnance Corps. Dr. Lewis also holds the Legion of Merit for developing a new type of grenade fuse, now in use in Korea.

The Associated Industries of Massachusetts elected ROBERT C. SPRAGUE'23 twentieth president of the organization at its meeting in Boston on October 25.

DAVID A. SHEPARD'26, alumni term member of the M.I.T. Corporation, was elected a member of the board of directors of the Standard Oil Company of New Jersey, effective December 1, 1951.

RALPH F. CAREY'27 was made vice-chairman of the National Oil Industry Information Committee at the convention of the American Petroleum Institute in Chicago during November. He is the first New England oil man to become a vice-chairman in the national organization.

The Standard Oil Company of Indiana elected DAVID GRAHAM'29 financial vice-

president of the company on November 13, 1951.

GUILLERMO ZULOAGA'30 has been appointed to the Creole Petroleum Corporation's board of directors, as reported in an October issue of *Time* magazine. This U.S.-owned enterprise is second among the world's oil producers. *Time* goes on to say: "As a member of Creole's board, Guillermo Zuloaga is the most important South American in the oil industry."

One of the nation's highest professional honors was conferred upon DONALD B. SINCLAIR'31, with the announcement of his election as 1952 president of the Institute of Radio Engineers. Dr. Sinclair is chief engineer of the General Radio Company in Cambridge, Mass.

CHARLES W. MACGREGOR, staff, of the Department of Mechanical Engineering at M.I.T., was appointed vice-president of the University of Pennsylvania, effective in February. In his new post, Professor MacGregor will head the department of engineering and scientific studies.

Other Achievements:

HUGH J. MULVEY'30, chief design engineer of the Piasecki Helicopter Corporation of Morton, Pa., received an award on November 14 from the Department of the Army for his contributions to the World War II effort in industrial intelligence. Mr. Mulvey served with the Technical Industrial Intelligence Committee which investigated enemy industry for the Joint Chiefs of Staff near the end of the last war.

WILLIAM SHOCKLEY'36, head of the transistor physics research department of the Bell Telephone Laboratories, has been named recipient of the Morris Liebman Memorial Prize for 1952 by the board of directors of the Institute of Radio Engineers. The award was made for Dr. Shockley's contributions to the theory and practical application of transistors, which are the first serious competitors for electron tubes, such as are used in radio receivers.

BURNHAM KELLY'41, Associate Professor of City Planning at M.I.T., lectured to the Buffalo and Erie County Planning Association, Inc., on "The Vital Need for a Realistic Housing Policy," at Buffalo, N.Y., on October 31. Professor Kelly also participated in a panel discussion on November 2 at the University of Michigan, having as its topic, "Changing Community Patterns as a Result of Industrial Relocation."

WILFRED ROTH'48, together with co-inventor Stanley R. Rich, recently developed an electronic testing instrument which, according to the Creedmore State Hospital, Long Island, N.Y., can tell with a high degree of accuracy whether a person is mentally ill. The instrument, which makes use of ultrasonics, may have signifi-

cance in screening out many psychotics in mass examinations at relatively low cost without long, tedious psychiatric tests.

Obituary

ARTHUR E. ADAMS'82, August 10, 1950.
ORRIN S. DOOLITTLE'86, October 29.*
FRANK C. NASH'89, August 17.
CHARLES H. ALDEN'90, September 27.
BURTON D. BLAIR'91, August 30.*
WILLIAM W. GREEN'92, October 6.
GEORGE A. TABER'94, November 30.
LEWIS B. BREED'96, November 10.*
CONRAD H. YOUNG'96, November 16.*
EDGAR L. BARKHOUSE'97, November 1.
BRYCE METCALF'98, October 25.
GEORGE B. PILLSBURY'98, May 8.*
GEORGE A. PENNOCK'99, October 13.
ALBERT B. BRIGGS'00, November 2.
HAROLD B. MAYHEW'00, October 20.*
ROLF R. NEWMAN'03, September 9.*
EDWARD C. THOMPSON'03, November 23, 1950.*
GEORGE W. LANDRUS'04, September 7.
CARROLL C. CURTIS'05, May 5.
HENRY H. FLEISHER'05, November 13, 1949.*
JAMES F. FOUHY'05, September 16.*
ROBERT FOWLER'05, in August.*
ASA H. NUCKOLLS'05, August 31.*
CHARLES L. RODGERS'05, June 23.*
ROBERT E. WISE'05, September 23.*
ELMER R. BITLER'07, October 5.*
EDWARD A. DRUGAN'07, December, 1950.*
RAMON F. MUNOZ'09, November 10.*
J. THEODORE WHITNEY'10, November 28.
STANFORD H. HARTSHORN'11, October 23.*
WARREN B. HOPKINS'11, November 27.
JOHN E. KELLEY'11, date unknown.
HERBERT P. LARRABEE'11, September 22.
EVANS B. KEELING'12, July 4.
JAMES P. KING'12, November 6.
ROY P. WILLIAMS'12, October 31.
WYLIE J. DANIELS'13, October 3.*
WILLIAM H. BROTHERTON'14, September 7.*
HERBERT C. KLIPSTEIN'14, in October.*
JOHN E. LONG'14, date unknown.
FRANK J. MAZZEI'14, January 16, 1945.
ASHER W. JOSLIN'18, November 6.
BERNARD O. PINKHAM'18, September 9.
J. EVERETT ROWE'18, September 19.
HENRI J. CORMIER'20, November 6.
WILLIAM J. FITZGERALD'20, September 24.*
THERON F. HARVEY'20, October 12.*
JOHN L. EWART'22, June 5.*
MRS. PHYLLIS KRAFFT NEWILL'22, September 29.*
RUDOLPH R. SPANGENBERG'22, date unknown.*
CHARLES W. WHITTEMORE'22, November 19.
JAMES M. COOK'24, July 15.*
CLARENCE F. LATHAM'25, February, 1949.
SAMUEL SAMUELSON'25, October 26.
RAYMOND D. LEONARD'27, November 10.
ALAN D. WHITTAKER, JR., '27, October 8.
CHARLES L. RICHARDSON'30, October 11.*
WILLARD L. ULCHER'30, April 29.*

*Mentioned in class notes.

News FROM THE Clubs AND Classes

CLUB NOTES

M. I. T. Club of Central Massachusetts

The first meeting of the 1951-1952 season was held on November 19 at the Hotel Sheraton in Worcester with 24 members and guests present. Howard F. Atwood'32, President of the Club, presided. Our first speaker was Don Severance'38, who brought us up to date on activities of other clubs and introduced the principal speaker of the evening, Professor Lawrence B. Arguimbau. Professor Arguimbau gave a very interesting talk on the present uses and future prospects of FM radio. Tape recordings of some of the results of experiments recently conducted gave us a clearer picture of what may be accomplished by this medium in the future. Recordings also demonstrated the extent to which different types of FM receivers are capable of eliminating interference with relatively small differences in signal strength.

We noted with sorrow the passing recently of one of our members, Stanford H. Hartshorn'11. Stan was a loyal and active Alumnus and will be greatly missed by us all.

Officers of the Club for the current year are: Howard F. Atwood'32, President; Robert G. Clarke'35, Vice-president; Robert N. C. Hessel'27, Treasurer; Donald M. Whitehead'45, Secretary; and Warren H. Howard, 2-44, Assistant Secretary. The Executive Committee consists of Roderic L. Bent'19, S. Martin Billett'48, George R. Blake'39, Robert H. Brown'22, Wallace S. Crowell'32, Max Levine'25, Frederick E. Mader'32, William G. Scola'43, and Raymond R. Stevens'48.

The Executive Committee has arranged the following program for this season. On January 14 the speaker will be F. Leroy Foster'25, Assistant Director of the Division of Industrial Cooperation; on March 24, we will hear Joseph N. Scanlon of the Department of Economics and Social Science; and on May 5, we will have the honor of hearing Karl T. Compton. As an added feature of this latter meeting, which will be our annual Ladies Night, entertainment in the form of moving pictures will be provided by Oscar Horovitz'22. — DONALD M. WHITEHEAD'45, *Secretary*, 464 Salisbury Street, Worcester 5, Mass. WARREN H. HOWARD, 2-44, *Assistant Secretary*, West Main Street, Shrewsbury, Mass.

The M. I. T. Club of Chicago

On October 12, 100 members of the Club, with wives and guests, left town in five special cars tied to the Monon Railroad's No. 5, and headed for a week end at French Lick Springs, Indiana. Our host,

as on the last two similar trips in 1950 and 1949, was John Barriger'21, President of the Monon. Besides our own Chicago gang, H. E. Lobdell'17 was among those present. Lunch was eaten en route in our own diner, and afterwards those thirsty for knowledge took "optional courses in railroading" from the observation platform of John Barriger's business car. Dinner was also served en route, after which the train was backed onto its own private siding at Pluto's Personal Headquarters, the French Lick Springs Hotel. The evening was spent dancing, visiting, and playing cards.

The next day, Saturday, the gang split up for golf, sight-seeing, mineral water indulgence (both interior and exterior), and general relaxation. After a cocktail party on the train, a picnic lunch was served on the golf club lawn, and the 100 steaks, broiled over the charcoal fire, were a sight to behold. Afternoon tea was served at the appointed hour (back on the train) and was followed later by dinner at the hotel. Bob Faurot, 2-44, then showed movies of his recent trip to Yugoslavia, after which Elizabeth and John Barriger were presented with a gift from the group in appreciation of their wonderful hospitality. Cards and dancing rounded out the evening. Sunday morning, at 10:00 A. M., we headed for home, arriving in Chicago at 5:00 P. M. The trip was a huge success, and we are indebted to the Barriger family and organization, and to Phil Coleman'23, our Club Prexy, for a memorable week end. (These notes were collected by Bob Faurot, 2-44, and it is to him that your Secretary is indebted, with thanks.) — HARLAN H. DAVIS'40, *Secretary*, Precision Rubber Products Corporation, 400 West Madison Street, Chicago 6, Ill.

M. I. T. Club of Fall River

All Alumni in the area covered by the M.I.T. Club of Fall River are invited to be the guests of the club's Executive Vice-president, Robert C. Ashworth, Jr., '25, at the Quequechan Club of Fall River (306 North Main Street) on the evening of Friday, January 25th, at 7:45 P. M. There will be refreshments. The speaker of the evening will be the treasurer of the Corporation, Joseph J. Snyder, 2-44, and we are expecting our Club President, Rudolf F. Haffenreffer'95, with possibly Dr. Compton. Individual invitations will be sent to all M.I.T. men in the club area for whom we have a mailing address, but, since we know our list is incomplete, please consider this notice your invitation to attend. You are automatically a member of the Club if you live in Assonet, Dighton, Fall River, Somerset, Swansea, Touisset, or Westport in Massachusetts; or Bristol Ferry, Forestdale, Little Compton, Middletown, Newport, Portsmouth, or Tiverton in Rhode Island.

This is a good opportunity to get acquainted with other Technology men in

this district, so be sure you are on hand as guests of our gracious vice-president. — ROBERT F. BURNETT'10, *Secretary*, 242 Lincoln Avenue, Fall River, Mass.

M. I. T. Club of Great Britain

The Club celebrated its first birthday at a dinner meeting on February 13, 1951, at St. Stephen's Club, Westminster. The attendance of 24 represented nearly one-half of the total membership, which has since reached the 60 level; about 40 of these are permanent members and the others come and go from year to year. Early this year we were fortunate to have Professor J. H. Keenan'22 with us for six months. Over here as visiting professor at Cambridge University, he was able to bring us up to date with news from Cambridge, Mass., at the February dinner at which he was our guest speaker. Members were particularly impressed to learn of the grand success of the Development Program campaign.

The summer meeting of the Club was honored by the presence of President and Mrs. Killian. Members present included. Richard Barradell-Smith'40, A. S. D. Barrett'39, S. L. Bragg'49, A. E. G. Collins'14, P. V. Danckwerts'48, M. W. H. Davies'40, T. C. Davies'94, M. B. Donald'23, A. B. Drought'48, T. V. S. Durrant'25, P. E. G. Hammarlund'41, P. J. Higgs'22, G. O. Jones'47, J. L. McKelvie'49, I. H. Parsons'22, R. S. Robinson'32, D. N. Truscott'35, Channing Turner'09, J. W. Voelcker'23 (President), and C. S. Windbank'37. Dr. Killian spoke after dinner, giving a general survey of recent developments at M.I.T.; his remarks on the broadening of the education provided at Technology by virtue of an increase in time allotted to humanities, and his discussion of the liaison between industry and M.I.T. were of particular interest because these two aspects of university life are now receiving much attention in this country. We were also delighted to have as our guest at this dinner H. E. Lobdell'17, whom we hope to see again next summer.

Membership of the Club shows a steady increase in numbers in spite of the homing instincts of individual members. We do our best to contact all known Alumni in Great Britain, but any who have escaped our detection system will be welcomed if they write to — D. N. DE G. ALLEN, *Secretary*, Imperial College of Science and Technology, Prince Consort Road, London, S.W.7, England.

The M. I. T. Club of the Lehigh Valley

The fall meeting of the Club was held at the Hotel Easton, Easton, Pa., on Tuesday, November 13, 1951. The punch was served at 6:30 P.M. Some felt that it was too weak and should be materially strengthened; others, that it was at least as strong as punch should be. Otherwise

it tasted good. This is a perennial problem with us. A very good dinner was served at 7:00 P.M. for the 21 persons present. Our speaker was S. L. Muther '34, who is director of research and development at the Dixie Cup Company.

Owing to the small number of Alumni, I think more met and talked with others than usual, making the meeting a bit more successful than it has been. Because of the lateness of reservations, I do not have a full list of those present, but I shall note those I remember. Present were your Secretary, the vice-president (now acting president) John D. Briggs '42, the treasurer, Arthur F. Gould '38, Basil W. Parker '33, Edmund J. Flynn '19, Louis A. Wilson '14, Michael V. Herasimchuk '39, Isidore Loss '22 (who was largely responsible for the meeting arrangements and who did his work well), W. A. McGahan '47, Donald J. Blickwede '48, Joseph F. Libsch '40, John R. Sanborn '04, James V. D. Eppes '50, Howard M. Cyr '18, Charles W. Gotherman '13, Philip A. Lamb '29, David P. Burselson '38, Juri Markus, 2-44, the speaker, Roy W. Prince, Jr., '40, William V. Bassett '39, and at least one other.

The speaker, Mr. Muther, talked for some time about the nature of the paper cup business. Also he spoke about the low-cost requirements for raw materials such as paper, glue, and wax. Those of us in that behemoth of industry, the steel companies, were somewhat taken aback to learn that the paper industry is probably more sizable than our own. It was surprising enough to learn just how large the business of preventing germ-laden drinking cups from reaching our lips has become, and how many new types of business have been found. We also learned that the prime business of Dixie is production of cups without wrinkling the paper, this company building its own machinery.

Mr. Muther, aided by Professor Parker, then presented a very interesting moving picture with sound, partly in color, telling of the production of a certain well-known make of paper. It started with a clear description of the primitive Chinese operations and then showed the typical operations from the laboratory standpoint. Having shown the basic operations, it then showed how a large paper plant carries out the host of details in practice. The handling of a paper break on the mill was very well illustrated.

We hope to have our next meeting late in January or early in February. It will be necessary to have it in Bethlehem, as the location is central to those who come to our meetings, and we do not expect any to come from far away, judging by past experience. This meeting will treat of Technology and the character of our Institute in Cambridge. Honorable Secretaries and others may desire to bring to it, as guests, young people who are considering an engineering or a scientific education, who might be interested in going to M.I.T. If successful in this respect, it is quite possible that one of our meetings will be handled in this way in the future. Thus we have one meeting devoted to an industry of the Valley; we now propose a meeting for boosting M.I.T. and its enrollment; the third or Annual Meeting has

become Ladies' Night, with a talk or presentation of general interest.

We have been asking Alumni to return to us postal cards indicating their interest in our Club, and noting any change in addresses. Some 80 persons have paid, or are paying, dues. About 35 cards have come back, and about 45, whose addresses may be considered known, have paid dues for the 1951-1952 period. Thus, nearly 80 out of 300 Alumni have been checked in some fashion. We hope that those who have not returned cards will do so, as we are planning to send notices only to members or those who specifically express a desire for them. It is expected that many who have not replied may be contacted by telephone during the coming weeks. Meanwhile, we greatly appreciate the efforts that Alumni or their relatives have taken to return cards to us. — EDWARD ADAMS RICHARDSON '19, *Secretary*, 3015 North Center Street, R.D. 2, Bethlehem, Pa.

M.I.T. Association of Minnesota

The Association had its fall dinner meeting on October 8 at the Minneapolis Athletic Club. The guest of honor was Professor Rolf Eliassen '32, of the Department of Sanitary Engineering at M.I.T., with President Ken Lucas '32 presiding. Professor Eliassen gave a very enlightening talk on recent developments at the Institute. He described how the Institute is taking on an increasing role of co-operation with industry, and told of the various problems confronting the Department of Sanitary Engineering. About 25 members participated in the lively discussion, which was preceded by a short social hour and banquet.

Another notable to pass through the Twin City was Lobby Lobdell '17, Executive Vice-president of the Alumni Association, who paid a call on Robert E. Mattson '26 in St. Paul, on his way to an M.I.T. club meeting in Duluth on October 15. — JOHN J. RUDOLF, JR., '48, *Secretary*, Minneapolis-Honeywell Regulator Company, 2600 Ridgway Road, Minneapolis 13, Minn.

The M. I. T. Club of New York

Our annual steak-stein dinner was held on November 1. Harvey Kram '42, chairman, lived up to his promises of all the beefsteak we could eat and an unlimited supply of beer. The entertainment was really stag, and the star of the show was called back for at least seven curtain calls. Lobby honored us with his presence, and, when last seen, was still clapping for another curtain call. There were approximately 200 members and guests present. They all had a good time and are looking forward to next year's affair.

The Club had its dinner dance on December 14 at the Park Sheraton Hotel. Plans for the February dinner are now almost complete. Deputy Secretary of Defense, William C. Foster '18, will be the main speaker. The affair will be held at the Waldorf Astoria on Friday, February 15. H. D. Kinsey '24 is chairman. Complete details will be available next month. — RALPH C. WILTS '41, *Secretary*, American Blower Corporation, 50 West 40th Street, New York 18, N.Y.

M. I. T. Club of Northern New Jersey

For the 1951-1952 season, the Club plans to hold meetings at various locations to attract more members, as it was felt a great many members were unable to attend the meetings in East Orange. Our area includes northern New Jersey and no central meeting place can be selected that would be convenient for all members.

The first meeting of the Club was held at the Hotel Suburban, Summit, N.J., on the night of November 13. The choice of Summit was a huge success, as the final count showed that 100 members and guests, including a few of the ladies, attended this meeting. There were several present who attended for the first time. Claude E. Shannon '40, of the Bell Telephone Laboratories, gave a very interesting lecture and demonstration of his maze-solving mechanical mouse—a machine that "thinks." Dr. Shannon developed this gadget as a hobby and reported this was the third model he had constructed. After the demonstration, refreshments were served and the balance of the evening was spent in renewing old acquaintances.

The following committee appointments were made by President Newton S. Foster '28: Program and House Committee, Donald H. Spitzli '27, chairman, Herman A. Affel '14, Clarence Van C. Chamberlin '23, A. Donald Green '26, Milton M. Manshel '22, and Ralph C. Swann '41; Placement Committee, Carole A. Clarke '21, chairman; Attendance Committee, Chester A. Williams, Jr., '39, chairman; Scholarship Committee, Walter L. Wise, Jr., '34, chairman, Gordon Holbrook '10, Geoffrey M. Rollason '13, Everett W. Vilet '22, and Donald D. Way '19; Reception and Fellowship Committee, Glenn D. Jackson, Jr., '27, chairman. James A. Emery, Jr., '38, submitted his resignation as member of the Board of Governors. — ALBERT C. FAATZ, JR., '37, *Secretary*, 22 Midland Boulevard, Maplewood, N.J. RUSSELL P. WESTERHOFF '27, *Assistant Secretary*, 823 East 23rd Street, Paterson, N.J.

M. I. T. Club of St. Louis

On November 7, 1951, the Club met at the Congress Hotel for its annual election of officers. The following Alumni have been elected to serve as officers of the Club for 1952: Ellis C. Littmann '33, President; Laurence P. Russe '41, Vice-president; William A. Hanpeter, 9-46, Secretary-Treasurer; Arthur R. Beckington, 9-46, Board of Governors; and Lawrence B. Feagin '24, Board of Governors.

At this meeting we also had the pleasure of having with us, as our speaker, Professor Erwin H. Schell '12, of the Department of Business and Engineering Administration at M.I.T. Professor Schell spoke on the subject of the Institute as a living being. He told us that the main building at Technology was designed to represent the head, shoulders, and arms of a man. The dome represents the head and the wings of the building represent the arms and shoulders. Professor Schell prefers to think of the Institute in terms of its Alumni, rather than as a great mass of

brick and mortar. He reviewed briefly the many new developments at Technology in the past few years and specifically mentioned the Development Fund and Mr. Sloan's magnificent contributions to it. He also brought us up to date on recent additions to the staff and Faculty, and the progress being made in housing and athletics.

The St. Louis Alumni enjoyed having Professor Schell present. The day before he arrived, St. Louis was covered by 12 inches of snow, which was the most we have had in this area in 39 years. We were glad that, in spite of this obstacle, Professor Schell was able to arrive in time for the meeting.—WILLIAM A. HANPETER, 9-46, *Secretary-Treasurer*, 1502 St. Louis Avenue, St. Louis 6, Mo.

M. I. T. Club of Schenectady

The Club has held two quite successful luncheon meetings so far this year, both at Ferro's Restaurant on Barrett Street. At the first, held on September 25, President Ed Lawrence'47 outlined the general program for the year and introduced the speaker, A. A. Merrill, of the General Electric Company. Mr. Merrill gave an interesting talk on the history of business forecasting from the ancient prophets to the present day, and on the methods and uses of forecasting in modern business. Thirty-one Alumni attended this meeting.

The second meeting, with 38 Alumni attending, was held on October 23, and featured a talk by Frank V. Battle, special agent in charge of the Albany Field Office of the F.B.I. Mr. Battle was an extremely interesting speaker and his talk was very well received by the members. He discussed the history and operations of the F.B.I. both locally and nationally and interspersed his talk with interesting case histories and comments.

Among those attending the meetings were the following: J. E. Aker'38, W. W. Aker'41, J. R. M. Alger'49, R. W. Austin'42, W. O. Bachli'33, P. H. Baker'48, E. H. Bancker'18, C. F. Barrett, Jr., '34, E. R. Barriere'49, H. W. Bibber'20, R. E. Brandon'50, Francis Brown, Jr., '48, J. F. Brown, Jr., '50, Mrs. Bruce O. Buckland'20, J. H. Burnham'34, Harold Chestnut'39, K. P. Coachman'22, L. F. Coffin, Jr., '49, P. M. Currier'14, L. H. Dee'35, R. F. Garrard, 2-44, J. H. Germer, 2-44, M. W. Hellar, Jr., '47, A. deH. Hoadley'26, R. E. Homan'49, D. E. Irwin (General Electric Company personnel), G. M. Ketchum'41, W. H. Kitts, J. A. Kohn'41, M. H. Kurth'49, E. S. Lawrence'47, C. C. Lawry'39, J. F. Lucey'29, J. H. Macleod'41, J. W. Maurer'48, R. W. Newman'36, C. F. Olson'41, K. A. Pauly'96, L. G. Peterson'36, A. S. Powell, Jr., '49, B. W. Roberts, Jr., '49, W. B. Rodeman, 2-44, Hansjoerg Stern'50, Andrew Vogel'13, and R. E. Wilson, 6-45.

At a meeting of the Steering Committee, the following committee chairmen were appointed: Scholarship Committee, W. B. Rodeman, 2-44; Civic Projects, E. W. Lawrence'47; Reception Committee, Frank Brown'48; and Membership Committee, Paul Baker'48 and John Macleod'41, co-chairmen. In addition, each of the 10 members of the Steering Committee was assigned responsibility for

one of the monthly meetings.—ROSWELL W. AUSTIN'42, *Secretary*, 1262 Lowell Road, Schenectady, N.Y.

M. I. T. Club of Southern California

The month of November was the high point in the history of this Club in various fields: active membership, cash on hand, and general interest of Alumni. This interest culminated in the attendance at the meeting on November 6, at the University Club, of 245—the largest at any regular meeting, only surpassed by the dinner for Dr. Killian which was put on by the Development Campaign. Much credit is due the program chairman, Cunningham'27, who was in charge of the arrangements, for the most pleasant time enjoyed by all.

Dr. Compton's "Advances in Modern Science" gave a world picture of what might be—both in peace and war. He shared the hope of all—that war was not a necessity—but said that reserves were necessary for some time. The new advances at Technology were described, including a veering toward training men in leadership of men, as well as in science. Dr. Compton mentioned the great value of the conference to be held here on Saturday, January 26, and answered questions on a variety of subjects. All agreed that this was one of the best meetings ever attended and that they would be out for the next. Dr. Compton's train was met by Breyer'10, Beebe'10, Morton'13, Hereford'24, MacCallum'24, Cunningham'27, and Golsan'34.

The pictures appeared in the Los Angeles papers with his comments on the world situation. It was a great pleasure and honor to have Dr. Compton with us and we most sincerely trust that the Ford Foundation will require his early return and frequent visits. Mellema'15, who took charge of the reservation for classes, said that affairs of this character made one proud of his graduation from M.I.T.

At the head table with Dr. Compton were Dr. and Mrs. DuBridge, Mr. and Mrs. Frank A. Steele, H. Rowan Gaither, our President, Golsan'34, Vice-presidents Hereford'24 and Cunningham'27, and their wives. On the reception committee were the following Alumni and their wives: Golsan'12, Banks'22, Calvin'12, and Holmes'14. The publicity was handled by Strauss'38; the registration by Stanley, 2-44, Dickey'47, and Dinger'48; and many other Alumni co-operated to make this event a great success. Bill MacCallum'24 was a leading spirit in both the preliminaries and at the meeting.

As this is probably the closing report of my four years as secretary, I wish to thank you all who have made the associations so pleasant and worth while. George Cunningham'27 has been the most consistent force, starting with the 1946 directory, of which I was business manager and he was assistant editor. Ken Kahn'15 was editor, and his death in my second year removed a pillar in this Club. Growth has been steady, with an up-turn when the Development Campaign was started, and a steeper surge when Golsan'34 was made editor of the 1951 directory and then took the presidency. The Club is now in

strong hands and should become the best in the world. My sincere good wishes to all.—HIRAM E. BEEBE'10, *Secretary*, 1847 North Wilcox Avenue, Hollywood 28, Calif. (Telephone: Granite 9572)

Washington Society of the M. I. T.

The October 11th meeting of the Society, the first of the new 1951-1952 season, brought nearly 100 Alumni and guests together in the popular Army and Navy Club.

In the necessary absence of the Society's president, Albert F. Bird'30, First Vice-president this season, commended Richard McKay'21 for arranging such a fine program for this first meeting of the year. Mr. Bird introduced each of the Society's new officers and promised everyone connected with the Society plenty of work during the coming months in assisting the committee in its plans to expand the activities of the group and its co-operation with the Cambridge offices in the many M.I.T. plans now shaping up. A more definite program for the participation of the Society and each active Alumnus in this region was promised for the next monthly meeting.

Mr. Bird introduced the honored speaker of the evening, Nelson T. Johnson, Secretary General of the Far Eastern Commission. Mr. Johnson's long experience and distinguished career in the United States Foreign Service provided a fitting background for his talk on timely world events, especially those relating to the current events and trends in Asia. Mr. Johnson first recalled the M.I.T. Club of Shanghai, and labeled it as one of the most vocal and active groups of its kind in the world. Turning to an analysis of the position of the United States in the world today, he termed America as a symbol of freedom in an unsettled time. How we obtained that position was traced down through the upheavals of early Europe, from the era of Mongol control of most of Russia to the present time. Into these developments, Mr. Johnson interspersed the accompanying progress of international law and the effects of colonization on the thoughts of men and the actions of nations in replacing the old feudalism with a freer nationalism intermixed with some imperialism. Out of all these experiences, it was brought out that the trend is toward adoption of our own principles of the freedom and the dignity of the individual as a sound foundation for co-operation of, and commerce among, all nations of the world. It was evident that the increased attendance and the new spirit of sociability augers well for coming meetings of the Society.

The "coat-pocket" tags gathered up after the meeting account for the following as present: G. W. Stone'89, J. G. Crane'90, W. H. McAlpine'96, P. L. Dougherty'97, F. A. Hunnewell'97, H. M. Loomis'97, A. M. Holcombe'04, Lewis Newell'04, G. C. Riddell'04, J. A. Furer'05, E. F. Kreigsmann'05, A. H. Van Keuren'07, K. P. Armstrong'10, A. M. Pederson'12, W. E. Wentworth'16, C. K. Allen'17, G. E. Walker'17, E. W. Huckins'18, W. M. B. Freeman'20, H. J. Abrams'21, Richard McKay'21, C. F. Blanchard

'22, D. D. Spoor'22, H. E. Weihmiller'25, A. S. Heyser'26, J. Y. Houghton'26, F. D. McKeon'26, Mary O. Soroka'26, R. S. Wilson'26, J. A. Plugge'29, C. J. Roggi'29, N. P. Stathis'29, A. F. Bird'30, J. R. Bloom'30, L. W. Glowa'32, J. M. Culverwell'33, R. L. Lee, Jr.'33, G. G. M. Bull'34, F. S. Walters'35, Paul Baral'40, Tan-Chih Lu, 2-44, T. C. Warner, Jr.'47, J. H. Fisher'49, W. A. Forsyth, Jr.'49, T. J. Whitlow'49, N. L. Lahiry, G.—GEORGE W. STONE'89, *Secretary*, 410 Cummings Lane, Chevy Chase 15, Md. HORACE E. WEIHMILLER'25, *Assistant Secretary*, 537 Standard Oil Building, Washington 1, D.C.

CLASS NOTES

• 1886 •

The Secretary received notice of the death, on October 29, 1951, of Orrin S. Doolittle, M.I.T.'86, of Yonkers, N.Y. I have received a clipping from the Yonkers *Herald Statesman* of October 29, containing the usual death notice and a half column of obituary from which I quote: "Orrin Sage Doolittle, one of the oldest members of the American Chemical Society and former sales-manager of the Allied Chemical and Dye Co., died early today in Doctors Hospital, New York City, at the age of eighty-seven. A Yonkers resident since 1905, Mr. Doolittle was a leading Presbyterian layman here, for many years an elder of the First Presbyterian Church and for eight years superintendent of its Sunday School. Born in Chester, Conn., Mr. Doolittle was the son of the Rev. and Mrs. Edgar Jared Doolittle. He was graduated from the Williston Seminary, Easthampton, Mass., in 1881 and from . . . Technology in 1886. Mr. Doolittle began his business career with the Pennsylvania Railroad in Altoona, Pa., and rose to become chief purchasing agent of the Reading Railroad in Reading, Pa. In 1905 he became associated with the Semet-Solvay and Solvay process Companies and was general sales manager in 1918 when they were absorbed by Allied Chemical and Dye. He continued in the head sales post for the division until 1926 when he retired. Since then Mr. Doolittle has been serving as consultant to various chemical concerns. Besides his religious interests here, Mr. Doolittle was active until recently in the Anthropological Club of Yonkers." As the Secretary may not always be so fortunate as to have a friend who can supply a necessary newspaper clipping, let this be a warning to other '86 members: While a notice of their death is something to put in *The Review*, we should much rather have something signed by them than by the undertaker.

The Secretary has been under the weather, though not under the sod, thanks be, for a month, with a renewal of his back trouble which has made lying prone the most comfortable position he could get into. Mrs. C. intimates it is his natural objection to work that is keeping him down and letting her bring in the

wood. However that may be, she is doing a wonderful job preparing meals, getting the wash out and in, going to the post office, writing letters, driving and cleaning the automobile, bossing the job of getting the storm windows and doors on, clearing up the garden and burning the trash, editing his secretarial notes, and so on. If she had a sister (who took after her) I would gladly recommend her (the sister) but not she—oh no! Has any member of '86 a better one to recommend? Whatever you say in the affirmative, I shall not believe you. So—so long.—ARTHUR T. CHASE, *Secretary*, Post Office Box 4, Island Creek, Mass.

• 1890 •

Will Curtis has very kindly sent us the "Franklin W. White Obituary" published in the *New England Journal of Medicine* for June 28, 1951: "As a youth he had many interests. He enjoyed gardening, played the violin, sang solos in church, acted in Shakespearean productions, climbed mountains and sailed. While at M.I.T. he was bacteriologist for the Massachusetts State Board of Health and was sent abroad to investigate water systems. He helped in the establishment of the reservoirs at Framingham." Soon after his graduation from the Harvard Medical School and after studying abroad, he became connected with the Massachusetts General Hospital and also became a member of the medical staff of the Boston City Hospital where he was active from 1905 to 1950, and "was always a helpful adviser to house staff, visiting colleagues and students. . . . In his practice as well as in his teaching and clinical studies, in his hours of rest and recreation as well as in his hours of work, and in every aspect of his life Dr. White was the beloved physician who set an unpretentious example to a host of students, colleagues and other acquaintances."

The Secretary had the pleasure of calling on Bertram Davis last fall and found him very pleasantly located by the side of a lake in Ashland, Mass., and planning to spend this winter there with his daughter and brother. He was well recovered from the broken leg reported in the November Review. He told of living an out-of-doors life, his early work being in Massachusetts building dams, followed by similar work for the United States Reclamation Service at Klamath Falls, Ore., and in California and Utah. After 10 years on the Pacific Coast he went to Tulsa, Okla., and continued his outside work by supervising construction.

From his daughter, Elizabeth Foster of La Jolla, Calif., we learned that Cassius Foster sold his place at Burt Lake, Mich., several years ago, as his health was failing, and he has been living with his daughter, Mrs. Edward F. MacNichol at South Hamilton, Mass. We regret to learn that his eyes give him some trouble and he also suffers from arthritis.—Among the 1951 legacies received by M.I.T. is one of \$25,000 from the estate of George L. Gilmore, "to be known as the Class of 1890 Fund." Inquiry at the treasurer's office as to any designated purpose brought the reply that "there are no restrictions as to its use." It would appear that others

might add to this fund if taxes and the shrinking dollar values do not consume our entire savings while we linger on.—GEORGE A. PACKARD, *Secretary*, 53 State Street, Boston 9, Mass. CHARLES W. SHERMAN, *Assistant Secretary*, 16 Myrtle Street, Belmont 78, Mass.

• 1891 •

The Boston *Globe* of November 21st reports a testimonial dinner given at the Hotel Somerset by 150 prominent hotel men to honor five long outstanding leaders in the hotel business, among them our revered classmate, J. Linfield Damon. The following extracts will be interesting and will bring back some memories of the old Hotel Thorndike: "Five elder statesmen who have rendered outstanding service to the hotel and club industry in New England were honored with a testimonial dinner attended by more than 150 at the Hotel Somerset last night. Damon, whose father and uncle were in the hotel business before him, also has been in the hotel business all his life. He apprenticed at the Atlantic House in Nantasket, acquired by his family in 1867. He became manager of it in 1887. After that he became manager of the old Thorndike Hotel on Boylston at the corner of Church St., now the site of a restaurant. There he stayed until 1920, when he moved to New York to become vice-president of the United Hotel Company of America, which had a chain of 21 hotels in this country and Canada. He has also served as vice-president of the Hotel Roosevelt in New York and as president of the Bancroft Hotel in Worcester, now the Sheraton."

I have just received from Harry Young a very interesting package mailed to him by one of Charlie Garrison's sons. It contains photographs of some of our '91 class reunions and also news clippings giving detailed accounts of M.I.T. football games played in 1888 and 1889, with the names of players who battled valiantly for the glory of M.I.T. and the class of '91. It appears that in 1888 M.I.T. won first place in "The Northern League," scoring 176 points to 15 by opposing eleven's. Two extracts from the report of this noteworthy event give statistical data and record of plays by two '91 men on the team, who of course were largely responsible for that glorious result: "Northern League Champions. Sketches of the Men Who Won First Place in Foot Ball for Technology. For the first time since the present game of foot ball has been played, the Institute of Technology eleven of this city has won the championship of the northern college league. The brilliant success of the team this year in winning every championship game played, and scoring 176 points to 15 by opposing elevens, compensates for the loss of the championship to Williams two years ago at the memorable Thanksgiving game at Springfield. Otto Germer, '91, has played half-back this year, and his running and dodging have been brilliant features of the later games. Germer is the youngest and lightest man on the eleven, being but 17 years old, and weighing 125 pounds. He comes from Erie, Pa., but was at Andover two years, where he played substitute on the academy team. Charles Garrison '91, has played in several games

this year, and has done good work back of the line, kicking being a strong point. Garrison is from Roxbury, and played half-back two years in the Latin school team, and in '85 and '86 on the Hopkinson eleven. He is 19 years old, and weighs 145 pounds." Another clipping reports a game with Harvard in 1889, giving a score of Harvard 62, Technology 0. If this is not a mistake in the scoring, it can, of course, be easily explained by the fact that there were only two '91 men on the Technology eleven. These clippings also report the field rush in 1888 between the sophomores and our own 1891 freshmen. This was held on the Union Grounds, a triangular field between the Boston and Albany Railroad tracks, Huntington Avenue, and what is now Stuart Street. One access to this field was by a long flight of wooden stairs from Dartmouth Street near the bridge. Rushing between sophomores and freshmen in the buildings had become serious in previous years, and this move for a field rush was hoped to work off all surplus energy and enthusiasm and solve all future trouble. I quote from the news clipping: "Immediately after time was called, the sophomores and freshmen arranged themselves opposite each other for the cane rush. The two bodies were compactly formed, the freshmen in irregular shape, the sophomores like a wedge, the small end in front. Soon the freshmen started down the field, and the wedge advanced to meet them, at first slowly, then faster, and when they met it was with a rush. The two fronts, forced on by the crowds behind, were raised over a foot from the ground; then they fell back, and the next instant the two had mingled into one rushing, shoving, yelling crowd. Both sides claimed the rush. The loss of the game of foot ball by the freshmen class is supposed to settle the question as to whether they will be allowed by the sophomores to carry canes at institute gatherings. Whether it does or not, there will probably be the usual little skirmishes over the occasional appearance of a cane in the hands of an enthusiastic freshman." I must call attention to an error. It was the freshmen who formed the wedge and, when the formations met, the front ranks were forced up some two or three feet and fell over piled up like cordwood—four or five men high. I know, for I was in the pile with my wind crushed out.

A very kindly letter has just been received from Miles Sherrill, M.I.T. 1899, reporting that he had talked with our old '91 classmate Philip Marquand at the Valley Head Hospital, Concord, Mass. He thought Marquand would appreciate a visit from an old classmate, and I will make it a point to see him very soon. We have a report of the death of Burton D. Blair on last August 30th, but no other information. Henry F. Noyes has a change of address from Bridgeport to 1330 Cut Spring Road, Stratford, Conn. Ernest Tappan has just sent in a clipping from a Plymouth, Mass., paper which reports a beautiful memorial tribute and resolution recently adopted by the Board of Directors of the Jordan Hospital in recognition of the fine character, public service, and philanthropy of our highly

esteemed classmate, Francis C. Holmes. His death on March 17, 1950 was reported in the May Review of that year, with a brief obituary, which is deservedly amplified in the following extracts from the memorial resolutions: "Francis C. Holmes was one man in a generation possessed of such fine qualities in rare abundance that his very presence and example of living leave an enduring impression. The history of the growth and development of Plymouth in the last generation is to a great extent the reflection of his manifold interests in the fields of industry and commerce, and the political and civic life of the community. His talents and abilities were abundantly displayed in his management of the affairs of the Plymouth Cordage Company, his participation in the activities of our banking institutions as director and trustee, his service to local government in various capacities on appointed committees and elective public offices, and his active participation in the humanitarian work of our civic and charitable organizations. His many gifts during his lifetime not only made possible the establishment of a modern X-ray department and the completion of the Holmes Wing, but served as a great inspiration to the officers and directors of the hospital to give their best toward efficient management. In grateful appreciation of this most valued relationship, the Board of Directors of Jordan Hospital pause in their deliberations to record with sorrow the passing of this great gentleman and public benefactor." — FRANK W. HOWARD, *Secretary*, in care of Bemis Associates, Inc., Post Office Box 147, Watertown, Mass.

• 1895 •

Strange as it may seem, we have a few class letter writers left in our ranks who can be depended upon to inform your Secretary of their doings. One such lad is Eddie Alden, who is off again on his Florida trip. This year his route is via Trenton, N.J., Elmira, N.Y., to see some of his relatives; thence to Pinehurst, N.C., and possibly Atlanta, Ga. You can reach Mrs. Alden and Eddie in care of the Beach Realty Company, Jacksonville, Fla. He disclosed the fact that his "trusty old bus" has been exchanged for a new Packard Mayflower, which he is enjoying.

Latimer W. Ballou, President of the Woonsocket Institution for Savings, has suggested the plan to have GI's arrange with their finance officers to have their monthly allotment checks mailed direct to their savings bank, for safety and convenience of their families. Lat helped to organize the Guerin Spinning Company in 1896, from which he severed his connection when the firm became the Guerin Mills, Inc., in 1920. Like his grandfather and his father before him, he has been prominent in banking circles. Lat has been president of the Common Council and the Board of Aldermen in Woonsocket, R.I. He has long been active in Woonsocket and Providence civic and fraternal circles. From 1931 to 1936 he was the state's bank commissioner, becoming the president of the savings bank thereafter. Happy New Year to all the mates of '95. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

• 1896 •

We greet you all with best wishes for a Happy New Year, and trust your Christmas festivities met with your fondest expectations. The Secretaries have appreciated your comments on the report of our 55th reunion, and Charles Gibson, when making a personal acknowledgment of our expression of his activities during that time, suggested that we plan for a mid-winter dinner and exchange opinions created by the unrest of recent months. We had a telephone call from Butler Ames upon his return from a summer in Italy. He seemed very alert and evidently enjoys the possession of an active mind. May we all share in this ability to be of some public service commensurate with our abilities. A letter was received from Henry Tozier, in which he says: "Since my April siege in the hospital and the last week in June, I have been enjoying good health. My only regret is that I was unable to attend the 55th reunion of the Class of '96." John Ashton writes from Lawrence, Mass.: "I was very pleased to receive your letter. I am one of nine children and the only one left. A twin to another brother reached 87. My father living with me was 90, and if I do not have any more heart attacks, I think I will have the record. Leaving for Florida tomorrow." A card came from Minor S. Jameson in Florida. This is his first winter there and he says, "maybe it will renew my youth." A letter dated November 14th was received from Bradley Stoughton, thanking us for the letter of June 27th and the list of signatures enclosed. He is having this framed with the picture Will Coolidge sent to all who attended the reunion. During the summer he was in the Adirondacks as well as traveling to Pittsburgh, Cleveland, and Buffalo. During September and October, he was traveling with a group of overseas "conferes" who were here for the World Metallurgical Congress, sponsored jointly by E.C.A. and the American Society for Metals. A very generous donation was enclosed for the Benevolent Fund. Another member of the Class is including in his will a bequest of \$500 to this fund, with the understanding that any amount remaining in the fund at the termination of the class organization shall revert to the general fund of the Institute.

A very interesting letter came from James Driscoll, in which he says: "*The Engineering News Record* of October 25th has a Goodyear advertisement on page one about highways, signed P. W. Litchfield, which says, 'Time has come when we must do something about better roads besides talk.' In the same issue is a picture of Charles Gilman Hyde as one of four honored by the American Society of Civil Engineers for outstanding service in the field of engineering." From the Norwich, Conn., *Record*, comes further information concerning our classmate's honor: "Among four new honorary members of the American Society of Civil Engineers, announced at the 1951 convention in New York last week, is Charles Gilman Hyde of Berkeley, Calif., formerly of Norwich. The convention program contained the following sketch of Mr. Hyde: Combining engineering teach-

ing and consulting work in a long career of public service, Charles Gilman Hyde was an instructor in civil, hydraulic and sanitary engineering subjects at the University of California for 39 years. Since his retirement in 1944, with the rank of professor of sanitary engineering, emeritus, he has continued his sanitary and hydraulic engineering practice in Berkeley. Born in Norwich, Conn., he was educated at Norwich Free Academy and at . . . Technology, from which he received the B.S. degree in sanitary engineering in 1896. Prior to going to California in 1905, he served four years in the engineering department of the Massachusetts state board of health; two years in Philadelphia on water purification investigations; and three years in Harrisburg, Pa., on water purification experiments and the design and construction of water treatment works. During his 46 years in California, Professor Hyde has been actively concerned with a number of water supply, sewerage and environmental control problems and projects in the Pacific coast area."

Word from John Tilley reports building operations somewhat limited, and he sends his special greetings to all the Class. He still looks back on the 55th with great satisfaction.

Since our last issue, we sadly report the deaths of Lewis Breed and Conrad Young. Some of you will remember that Lewis came to Swampscott from a sickbed, but bore up under the activities incident to a reunion with a quiet and reserved enjoyment. His sudden passing bears evidence how fortunate it was that he survived the reunion without mishap. The Secretaries received a telegram announcing the sudden death, on November 16, of our beloved Con. It read as follows: "Conrad passed away this morning cerebral hemorrhage. (signed) Abbie." He and Abbie had closed their house at Bass River and were about to start for Florida and way stations. He went back to the house for a last checkup. Not returning, Abbie made search and found him the victim of a cerebral hemorrhage, with death almost instantaneous. Our next issue will give biographical sketches of both these classmates. "Life is but a journey. Taken on a train, With a pair of travelers, At each window pane. I may sit beside you, The whole journey through, Or I may be seated elsewhere, Never knowing you. But if fate should place me, To sit at your side, Let's be pleasant travelers, It's so short a ride." This note has just been received from Mrs. Lewis Breed: "Your kind letter of sympathy and the piece of exquisite chrysanthemums from the Class of '96, M.I.T., were greatly appreciated by us. With all the great sorrow, there is the sweet memory of the 55th reunion which he had so looked forward to and enjoyed so much. He has often spoken of our pleasant breakfast together that last morning. With a heart full of thanks from our family for your deep sympathy and the expression of love from his classmates, sincerely, Alma Y. Breed."—JOHN A. ROCKWELL, *Secretary*, 24 Garden Street, Cambridge, Mass. FREDERICK W. DAMON, *Assistant Secretary*, 275 Broadway, Arlington, Mass.

• 1897 •

To date, November 21, the deadline date for copy to be published in the January issue of *The Review*, the Secretary has received letters from but two of the Class, relative to a reunion in June, 1952. One of these favors a reunion similar to those of the past, and the other suggests simply a dinner on the Sunday before Alumni Day at a golf club outside of Boston. This meager response to the request in the November number of *The Review* is rather discouraging, we must admit. We hope that more replies will be forthcoming. The Secretary has just received a brief note from James M. Brown requesting the address of one of the Class. This note was a pleasing surprise, and we have sent the address on to him. Jim's address is 115 East Gambier Street, Mount Vernon, Ohio.—JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

• 1898 •

The following notice appeared in the Boston Sunday *Herald* of October 14, 1951: "Arlington Couple Wed 50 Years — Mr. and Mrs. Elliott R. Barker of 20 Lombard Road, Arlington, will celebrate their golden wedding anniversary Saturday night, with a reception in the First Baptist Church, Arlington. Married in Bartlett, N.H., they have lived in Arlington for 44 years. Before he retired about 15 years ago Mr. Barker was a chemical engineer and sulphite mill expert, with an office in Boston. A former state legislator, he has also served in a number of Arlington town offices. The couple have two sons, Elliott R. Barker, Jr. of Waterville, Me., and Kenneth Barker of East Longmeadow; three daughters, Miss Louise Barker, at home; Mrs. Clement L. Cooledge of Lexington and Mrs. Joseph H. McKown of Arlington; also 10 grandchildren." The Secretary and his sister attended the reception, which turned out to be a very pleasant affair. It was held in the spacious parlors of the church. Agnes and Elliott stood in the smaller parlor and received the felicitations and well wishes of relatives and friends. Some hundred-odd were at the reception. We learned that the children and grandchildren arranged all the details. Many happy returns, Agnes and Elliott.

The following significant announcements by our distinguished classmate, Roger W. Babson, appeared in the Boston *Christian Science Monitor* of October 1, 1951: "Roger W. Babson, noted business analyst and financial forecaster, said military preparedness will become a permanent new industry rather than 'spontaneous affairs,' during wars. Speaking at the Babson 38th annual business conference, Mr. Babson declared that 'heretofore, war preparations in the U.S. have been spontaneous affairs, starting only when we are attacked, and stopping after we have won the war. We believe this era is over and that military preparedness will develop into a permanent new industry. . . . We believe that concerns are wise in taking on some of this new business if they can do so without neglecting any of their regular business.' Mr. Babson also

advised manufacturers, retailers and consumers to keep inventories low because 'unheard-of products are being developed in research laboratories' which will make large inventories 'out-dated and obsolete.' Mr. Babson expressed the opinion that labor unions 'will be responsible for the next business depression.' 'Yet, should we blame these labor leaders?' he asked. 'Back of them is the pressure by union members who in turn are egged on by their wives, made discontent by tempting magazine, radio and TV advertising. Remember that the more attractive such advertising becomes, the more certain there some day will be a financial collapse.'" Those classmates who attended the Golden Anniversary will remember the day at Babson Park and that in the morning Roger and Dr. Hinckley and other Babson experts gave a series of talks covering the economic situation. Doesn't this start you packing your bags for the 55th in '53!

President Edgerly has sent us the following letter which Mrs. Bertha E. Pillsbury has kindly written concerning her husband: "To Class of '98. Gentlemen: I am sorry to report to you the death of Brigadier General George B. Pillsbury on May 8th of this year. He always attributed all the success he had to the wonderful training he had in the Institute of Technology before he went to West Point. I am enclosing a little summary of his life, for you might like to have it for your annals. Aside from these achievements he was a noble, splendid man, and not alone my loss but a great loss to all who knew him, and loved him." In the letter was enclosed the following: "Brigadier General George B. Pillsbury, Corps of Engineers, U.S. Army, died at his home in Ross, Calif., on May 8, 1951. He graduated in the class of 1900 at West Point at the top of his class. After serving in the Philippines and Alaska, he served, from 1908 to 1912, as associate professor of mathematics at West Point. Later he commanded the 115th Engineers and served with the 102d Engineers in France in World War I. He received the Distinguished Service Medal for his work during the Somme Offensive. He worked extensively on the St. Lawrence Waterway Project and the Mississippi Flood Control. He served as assistant chief of engineers for seven years in Washington until his retirement in 1937. After his retirement he made extensive studies of tidal hydraulics. The Engineer Department published his book on that subject. He is survived by his wife, Bertha, his daughter, Mrs. William Pringle, and his three sons, George H. Pillsbury, Dr. Philip Pillsbury of San Francisco, and Thomas S. Pillsbury, instructor of chemistry and physics at Dominican College, San Rafael."

The Secretary well remembers General Pillsbury during his undergraduate days at M.I.T., and especially in the chemical laboratory at the top of Walker (remember that room, you '98'ers) under the late Professor Bardwell. Pillsbury was very expert in performing chemical experiments—making oxygen and avoiding an explosion, and so on—and in the mind's eye we can still see him charging up to the supply room for some needed

apparatus for another experiment. We thank Mrs. Pillsbury for her kindness in sending to us interesting facts concerning the life of her husband after he left M.I.T.

Turning to the other end of life on this planet, we have the following interesting letter from Dr. Alice Tallant, which was read and greatly enjoyed by those at the '98 get-together last June: "I am sorry that I cannot be at the '98 reunion this year. I still remember with the greatest pleasure our 50th, and 'if I'm spared' (as our German professor at Smith used to say, in giving out the next lesson), I have high hopes for 1953. I am still busy in practice, still bringing more and (I hope) better babies into the world — three last week! I am still running the settlement house clinic which is one of my pet projects, as they say nowadays, with a variety of patients whose ages range (really and truly) from two weeks to 80 years. Many of the patients are of Italian stock, and some speak little English, so I have acquired what strikes them as a real acquaintance with their language, so as to talk with them. 'Una intelligenza straordinaria,' one of them remarked politely, after listening to my efforts one day. My nonprofessional activities include church, the Smith Club, the Women's Overseas Service League, and a home for old people, which is named the Joseph Priestley House. While most people know that J.P. was a great scientist, few have ever heard that he was also an eminent Unitarian minister. The House is a Unitarian home, and his name was chosen on that account. He came to Pennsylvania to live, after persecution and the burning of his home, his laboratory, and his church had driven him from England. At our church (the First Unitarian), I am chairman of the Church Committee, which concerns itself with many church activities. In that capacity I have been in charge of two events during the past year. One was the celebration of United Nations Sunday, with the entertainment of a number of guests from the U.N. Secretariat in New York; the other, a meeting of welcome, with a luncheon, to the new members who have joined the church this year. So I keep busy. My best wishes to '98, especially to any individual members who remember me, including yourself." Thanks, Dr. Alice, for your nice letter and we indeed trust that you and a goodly number of '98 will be able to attend the 55th in June, 1953.

Will Steffens was good enough to send an extensive memorandum for the '98 get-together last June, from which we quote a paragraph, describing bridge replacement on a "hot" railroad in jig time to avoid holding up traffic: "Edgerly asked for it, so here is my salutation to my '98 classmates. Other than Lester Gardner, I have had no contact with the Class in many years. At one time I saw Roger Babson briefly while he happened to be in New York, and I also picked up Frank Spaulding in Pittsfield, Mass., while I was replacing old bridges on the Boston and Albany, and while inspecting the road with the Public Service Commission more recently. The program of bridge renewals on the Boston and Al-

bany was a most interesting assignment and included very personal contact with Professor Swain, whose untimely death was a community loss. The most important work of bridge replacements on a 'hot' railroad is to avoid delays to traffic. We held the record of fast and safe work by careful planning and co-operation of contractors. Falsework was erected of sufficient size that the new work could be assembled, riveted, and fitted with cross-ties. New and old spans were supported on steel rollers. At the time of lightest traffic each Sunday, the rails were removed from the old bridge, and the blocking then removed to have the steel-work rest on the rollers. Actual movement of the old and new spans as a unit was accomplished in 45 seconds. Replacing of the rails on the new work, and the temporary blocking on the piers and abutments then permitted trains to pass over the new work in 20 minutes from the time that the previous train had passed over the old bridge." Then follows an elaboration of railroad engineering practice and experience which covers two and one-half typewritten pages. This is too extensive for inclusion in the class notes, but as it would be of great interest to the Class, it will be arranged to send it in a special letter to the Class.

You have all received, as of October, 1951, Class Letter No. 8 from President Edgerly, with pertinent facts and interesting statistics. Also in this letter are suggestions of what the members of '98 can do. Enclosed with the presidential letter was a typical Gardnersesque letter. We shall have more anon — as Prince Hal in *King Henry V* remarked about Falstaff's men in buckram — about the 55th. Kindly note that Lester and Dan cannot do it all, and follow, s'il vous plait, their suggestions.

You will be reading these notes about New Year's, a time for resolutions. The boys and girls of '98 have wandered far since graduation: across mountains, plains, and seas; some apparently so far that they appear to be lost; at least, we never hear from them nor see them at reunions. Let us all highly resolve this New Year's, no matter where we may be, that we will make ourselves known to the Class and return, if possible, to M.I.T. for the 55th reunion in June, 1953. — EDWARD S. CHAPIN, *Secretary*, 463 Commercial Street, Boston, Mass. ELLIOTT R. BARKER, *Assistant Secretary*, 20 Lombard Road, Arlington, Mass.

• 1899 •

The *Northwest Architect* for March-April, 1951, contains an article by Jacob Stone, IV, discussing in detail his conclusions as to why Sather Tower, sometimes called the Campanile, on the campus of the University of California at Berkeley, has not stood the ravages of time. This tower, 234 feet in height, was built in 1914, only eight years after the great San Francisco earthquake. Every precaution was seemingly taken to prevent destruction by such natural causes or deterioration due to the elements. Nevertheless, cracks in the Raymond granite exterior were discovered in 1940, and since then pieces of the stone have fallen from time

to time, mostly from the corners, necessitating the construction of a board fence around the tower to keep people from being hit by these pieces of granite. Quite a number of theories as to the cause of the cracking have been advanced by various architects, but Stone's theory seems to be based on a sound hypothesis.

The outside shell of overlapping granite blocks are held together at the top of each vertical joint by a one-half-inch galvanized round rod, bent like an inverted paper staple. The masonry wall is tied to the steel frame for lateral stability, but eight inches of reinforced concrete was poured directly against the stone. Thus, the stone course forms a rigid bond completely around the structure. When the heat of the sun or atmospheric moisture reaches the concrete, irregular expansion results. The condition of the tower is causing much concern among University authorities.

On graduating from Technology, Jacob Stone worked for a short time for the architectural firm of Shepley, Rutan and Coolidge, but in 1901 returned to his native Minneapolis, and, in 1909, with Jerome Paul Jackson of our Class, formed the firm of Jackson and Stone, which continued, except for war service of the two members, until 1943 when Stone went to California. A picture of Stone and his three-year-old grandson indicates that he has stood the inevitable ravages of time better than the tower. — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. MILES S. RICHMOND, *Assistant Secretary*, 201 Devonshire Street, Boston 10, Mass.

• 1900 •

Your Secretary had the pleasure of attending the golden wedding anniversary reception of Harry and Anne Thayer last August. This was particularly interesting to him as he was present at their wedding 50 years ago. There must be other such anniversaries coming for members of the Class. Please let the Secretary know of them as they will be of interest to all.

Harold B. Mayhew of Chilmark, Mass., died suddenly at his home on October 20 at the age of 76, the victim of a heart attack. He had been retired for some years, returning to the town and estate of his birth. He had spent the active years of his life in Hyattsville, Md. Employed as a civilian engineer by the U.S. Navy, he had served in this capacity for the greater part of his life. He was chief of the chart construction division of the Hydrographic Department of the Navy. He attended the old South Road schoolhouse, Chilmark; East Greenwich Academy, Rhode Island; and was at Technology for three years with the Class of 1900, Course I. He served as a member of the cemetery commission for the town of Chilmark. He was also a member of the Martha's Vineyard Agricultural Society, Dukes County Historical Society, and served last year as president of the Association of Land Owners of Lowl ds and Meadows around Chilmark Pond. Surviving him are two daughters, Mrs. Theodore Meinelt of Chilmark, and Mrs. Louis Cecil of Hyattsville, Md., and a son, John Wesley Mayhew of Chevy Chase, Md. His wife died

in 1945. — ELBERT G. ALLEN, *Secretary*, 11 Richfield Road, West Newton 65, Mass.

• 1901 •

Bob Derby, in addition to being chairman of the Williamstown Dutch Elm Disease Control Committee for the last two years, has been elected chairman of the Berkshire County Dutch Elm Disease Control Committee. He has also recently been elected president of the Williamstown Taxpayers Association.

Mrs. Peterson quotes part of a letter from Lamot du Pont: "I had a letter on a business matter from W. W. DeBerard, in the course of which he mentioned his regrets at not getting to the 50th reunion." Carl Johnson, in his reply to the class letter last May, says: "I don't know about the other fellows but will tell you about me and the success I have been, which is this way. For years I have suffered in the belief that if I lived long enough I would wind up in jail, though perhaps ignorant innocence would bring my downfall, and here I am still in the clear at almost 70, too." Mrs. Peterson wrote me that she had heard from him last fall. She says: "Our good classmate Carl Johnson has been on the sick list since June. He took his little grandson on an 'educational tour,' he called it, of the most important cities of the country. He wrote me from Washington but shortly afterwards had a bad spell. I heard once later from him in California but not since."

Here is more news from Alfred Nutter, I, which should have appeared last month: "Since my contribution to the class notes has been nil, I will start from scratch. I left the New England home and relatives for Pittsburgh, Pa., right after commencement, locating with the chief engineer's office, Pennsylvania Lines West. After a short time on construction work, I was transferred to the bridge engineer's office, designing for track elevation and grade elimination projects. After three years I went to the Allegheny County engineer's office, surveying for roads and designing bridges. This engagement lasted for over 28 years. Then the depression. Part of this time I was a field engineer in a neighboring county and designer for public utilities companies. Age was creeping up and I was 'retired' in 1942. Since then I have kept mind and body busy as handy man for the neighborhood — from keeping buildings in repair to building garages. I don't want to forget to say that soon after leaving Boston I went back and married; and now I have two sons, one daughter, and six grandchildren. One granddaughter is now a sophomore in Boston University. A delightful evening was spent at the M.I.T. dinner on October 6, 1950, when Dr. Compton spoke. We had at our table younger class men and some of them, or their wives, were from our old home town of Chelsea, Mass."

Ralph Stearns, in his reply to the class letter last spring, says: "I had a fine cruise on the *Mauretania* this past winter, stopping at eight islands, Caracas, and Panama." Everett Pendleton, last spring, was just publishing *Brian Pendleton and*

His Massachusetts — 1634-1681. Frederic Ayers said, in his reply to the class letter: "The only '01 man I have seen for many years is A. B. Campau, Course IV. He is an architect in Grand Rapids, Mich., and has designed many outstanding buildings." — THEODORE H. TAFT, *Secretary*, East Jaffrey, N. H. WILLARD W. Dow, *Assistant Secretary*, 287 Oakland Street, Wellesley Hills 82, Mass.

• 1902 •

Dan Patch offers the following for the notes: "If these notes catch the eye of any classmate who has not yet sent in his card to Burt Philbrick anent the 50th reunion next June, let them tickle his memory and prick his conscience so that he will take action immediately, if not sooner. Remember, too, that if you cannot take in the whole reunion from the time we appear in academic gowns on commencement day morning, Friday, June 6th, until the final singing of the Stein Song at the Alumni Banquet on Monday evening, June 9th, you should try at least to attend some of the Alumni Day events."

To date, November, the following men have signified a hope that they may be present at Coonamesset: Allen, C. B., Allen, C. M., Allyn, Baldwin, Cates, Collier, Driscoll, Edwards, Everett, Fisher, Friend, Gannett, Gardner, S. A., Katzenmeier, Grant, Greeley, Hammond, Haskell, Hunter, Judson, Kellogg, Lowe, McKechnie, Manning, Mardick, Marvin, Millar, Mixer, C. G., Mixer, W. J., Moore, Nelson, E. E., Nickerson, Patch, Philbrick, Proctor, Reynolds, Robinson, Sawyer, Saylor, Sears, Shedd, Sherman, Taylor, G. S., Taylor, J. L., Jr., Tolman, Vatter, Wales, and Williams. The following have asked for further mailings and therefore seem open to conversion into guests: Ballard, Cutter, FitzGerald, Galaher, Hickey, Lewis, Lombard, Mahar, Mathesius, Nelson, A. T., Page, Robbins, and Steever. Don't forget to send Burt a short sketch of your life since '02.

In his answer to the questionnaire, Farley Gannett writes: "During practically all the 50 years since graduation I have followed the line of work which I prepared for in a general way. I have been in engineering all the time but not much of that time was spent in sanitary engineering, which was the course from which I graduated. For years it was hydraulic, and then it became electrical, and then it turned to valuation engineering, and now I am pretty well occupied with highway engineering. The company of which I am president, and have been for the last 36 years, has many divisions into which our work is separated, and we cover all those branches of engineering besides mechanical, heating, sanitary, and so on. I am still active in our organization and hope to be until I die. It is lots of fun, and I don't know just when I will become inactive. As my children are all girls, none of them have gone into the engineering profession and all three are devoting their time and attention to household duties and family affairs. They all live within about 25 miles of us, in and around Harrisburg. My principal interest outside of my business is my family; but I

have always had horses and devoted a good deal of my time to fox hunting over the last 25 years, having been honorary whipper-in, and then joint master of the Beaufort Hunt over most of the period. During the early part of my business career I was quite enthusiastic over golf for a short time, but then graduated to tennis and went into that pretty seriously for a good many years and am still playing a little doubles off and on, but no singles any more."

Tom Shedd writes: "For the last 25 years or more I have corresponded with people all over the world as a hobby, hearing from 180 different countries and collecting stamps (now 30,000 plus), post cards, railway time tables, and so on. Recently my name and address was published in a German periodical with the notation that I was interested in mathematics. Two wrote to me saying that they knew nothing about mathematics but would like to have me send them food and clothing. A young boy in Berlin wrote that he was always poor in mathematics but that he had a teacher who was a wonder and would I write to her but not tell her where I got her name. He did not give his name. I wrote to her that I was chiefly interested in primitive triangles but did not know as she had ever heard of them, but she replied that she had and was very interested. Another fellow, who had been a prisoner in Russia for a long time, wrote that he was going to make recreational mathematics his life work. Some of my correspondents have included a sheik in Mecca, Prince Tokugawa of Japan, a dietitian for cannibals in Papua, a 'T.B.' in Siberia (who recently wrote me that a cure for him was known over here), and others all the way from Iceland to the Falkland Islands, not forgetting a hermit in the French Society Islands." — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston 16, Mass.

• 1903 •

Notice has been received of the deaths of two members of the Class, with no details in either case. We wish some one of the Class would help us by sending information. Edward C. Thompson, II, died in Vista, Calif., on November 23, 1950; and Rolf R. Newman died in Los Angeles, Calif., on September 9, 1951. We assume that both of these men had retired from active work.

Two others of the Class are far from retiring. Myron H. Clark sailed September 15, on the *Ile de France* as a member of a five-man team organized by the Economic Cooperation Administration to help interest French industrialists in United States management techniques. The group, the first of its kind, will spend time in each of four industrial areas of France, and will hold seminars in each place. This is Mr. Clark's second trip to France, the first being after the close of World War I when he was sent there on a special study for the Army Quartermaster Corps. The following is from the Magazine Unit, Information Division, E.C.A.: "Mr. Clark's genial, straight-from-the-shoulder manner has made him friends in Lille, Nancy and here in Paris where he has just wound up a week of factory visits and in-

tensive seminars that are expected to help French industrialists reach their goal of a 4% annual boost in efficiency. In his talks given to 20 selected French business men, who listened to him through plastic ear-phones carrying a translation of his words, Mr. Clark stressed some of the top management methods he helped develop as vice-president of the U.S. Rubber Co. in N.Y." The Atlanta, Ga., *Journal and Constitution*, heads a column in its July 15th issue, "Hard Work Still Guide for W. E. Mitchell," and tells what he is doing, after having retired four years ago as president and general manager of the Georgia Power Company. "Hard work never hurt anybody," he says, and you can tell that it never hurt him. His every move shows vigor and zest for living. It would be somewhat futile to try to recount the things that Mr. Mitchell has done and is doing. He is completely wrapped up in his work as chairman of the advisory board of the Salvation Army here, and is chairman of the board of trustees of Jesse Parker Williams Hospital. He is also chairman of the board of trustees of the Georgia Tech Research Institute, and director of the Atlanta Chapter of the American Red Cross and the Atlanta Junior Speech School. Mr. Mitchell likes people of all races, ages and creeds. He has no desire to keep up with the Joneses, but is sympathetic with people and their problems whether they have lots of money or none at all." He has headed countless drives for money for various relief work, and has been sent on many special missions abroad for the government. "His wide knowledge of utilities caused his selection by the War Department to head the utilities section of the U.S. Strategic Bombing Survey in 1945 to study the effect of the strategic bombing done by Allied planes in Europe and Japan. Asked about the uniform he wore, he laughingly said, 'I was a synthetic Colonel.'" All of which sounds good for two members of '03. Long life to them.—FREDERICK A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, Box 103, South Wellfleet, Mass.

• 1904 •

A few items of news have trickled in, but we could use more. As previously stated, Herb Kalmus is our principal headline maker and we have three items referring to him. First is a news item with a Hollywood date line, showing how Technicolor is moving ahead. They have a two-million-dollar expansion program and are experimenting with new methods for cutting film costs. Herb is quoted as saying the following: "I think there is a demand for twice the 80 to 90 Technicolor pictures we are doing this year. Our expansion program is in line with our efforts in that direction. Our aim also is to see if there is any photographic process that will combine with ours to turn out good pictures at lowest cost." The second item concerning Herb was in the social column of the Boston *Herald* and referred to a welcome-home party, at their Cape Cod home, for Dr. and Mrs. Kalmus at which the engagement of their daughter, Diane, to Terry Mullin was announced. There

were 300 guests present and the description indicates it was quite a party. The third item is from the New York *Herald-Tribune* of October 17, under the heading "Business and Finance Leaders." This item gives a brief biography and a partial list of important accomplishments, all of which are well known to '04 men and will not be repeated.

Henry Stevens sends us a letter he had from Tammy Rockwood. As previously stated in these notes, Tammy got tired of retirement and went back to work. The following is quoted from his letter to Steve: "I saw Gene Russell a couple of months ago in R. H. White's and had a nice talk with him. He is the only one of our classmates I have seen for a long time except for M. W. Carty, whom I see on the train nearly every morning. He is still working for Stone and Webster and is supposed to be one of the best boiler plant engineers around. He is entitled to be pensioned off, but I hear that S & W are afraid that if they pensioned him he would simply go to work for a competitor, as other of their pensioned employees have done. I wrote you that I had gone back to work as chief engineer for Ganteaume and McMullen, and I am still there. They specialize in bakeries and food storage and distribution warehouses. They have about four for First National stores and as many for the American stores. I guess that at present I am the only Technology man there, but, until he left me, my assistant was an M.I.T. 1910 man named Henderson. Week before last I spent three interesting days at M.I.T. at the First United States Conference on Pre-stressed Concrete. Four or five hundred were there from all over the country. I am still playing golf but my game gets poorer every year, and this year anything under 100 is a good day for me. That is on the 18-hole course at Brae Burn. On the nine-hole course I can still break 90 consistently. I spent two weeks in July at Chatham and all our children (three) and grandchildren (three) were there with us. We found some housekeeping cabins off the main road and about a half mile from the ocean. I played no golf while there, in fact did not even have my clubs with me."

Steve also sent a letter he had received from Cap Curtis. An item of interest in this letter spoke of our classmate, the late "Volts" Ovington, who made a name for himself in the early days of aeronautics. The item referred especially to the track team and was as follows: "Volts, as you recall, was very good at about everything but did not excel at any special event. He was a decided influence in keeping the team in high spirits. Being an admirer of Houdini and of the great sleight-of-hand artists, he held us spellbound by his legerdemain demonstrations on the train trip to Hanover, N.H., for our track meet with Dartmouth, which we won 94-71, as I recall (1903). He also had x-ray equipment in his room so that one could examine the bones in his hand, and so on. Under the carpet in front of one of the doors was a switch, so placed that it would open the door as he stepped on it. He would have appreciated the modern electric eye."

Steve reports that he had visits from Ed Parker, Gus Munster, Harry Kendall, and Dwight Fellows. He says that retirement has not changed Gus much. He is just as retiring as ever. From Steve we also learn that Ed Parker had seen Dave Sutton several times during the past summer. The following item is quoted from Steve's letter: "I still eat thrice a day and sleep most of the night. I am always glad to see any of my friends (at Whitney Homestead, Stow, Mass.) who have any inclination to come, and as their visits are always unexpected as a bolt from the blue, perhaps they are more interesting. I know the memory lingers for days."

The Class will be sorry to learn that Charlie Homer had a heart attack in October while visiting his daughter in Dedham, Mass. The doctor ordered him to bed for six weeks, and we are glad to report that he is coming back very satisfactorily. He has received strict orders, however, to slow down his pace if he wants to stay here awhile. Don't forget, Charlie, that you have promised to attend our 50th reunion (only two years hence), so do as the doctor orders.

The annual solicitation for the Alumni Fund has been reactivated after having been suspended for two years because of the 20-million-dollar Development Fund. Louis Bouscaren has accepted the job of Class Agent for this fund and his job will be to raise the average of '04 giving. We have not been doing too well in the past.

The September 2 issue of the Brooklyn *Eagle* hails our classmate, Ambrose Merrill, as Brooklyn's "Man of the Week." The laudatory citation is too long to be quoted in full, but it speaks of his retirement from service as chief engineer at the Brooklyn Navy Yard after 46 years. The following quotations are taken from the citation: "Paying tribute to an unblemished and glorious career were Rear Admiral Paul B. Nibecker, Commander of the yard and more than 175 Masonic leaders, personal friends and professional associates. On his final day a blushing Mr. Merrill became the recipient of a handsome 16 inch television set tendered by the drafting room staff. Few ships have been put together at the Brooklyn Navy Yard without an assist from Mr. Merrill and his drawing board. For many years prior to 1929 he was in charge of turret-and-armor design, his work being built into the battleships *Arizona*, *New Mexico*, *Florida*, *Tennessee*, *New York*, and the heavy cruiser *Pensacola*. His biggest kick he says, looking back on his career, was working on the huge 45,000 ton *Missouri*, supervising a staff of 200 planners. Not all of these efforts were of the desk variety, either. During World War I he was responsible for designing mine-laying equipment used in the North Sea, equipment credited with a major role in ending the war."

The September 13 issue of the Rochester, N.Y., *Times Union* has this to say about Bob Phinney: "He has spent 44 years helping to keep American trains rolling smoothly. Meantime he has advised China, Spain, Holland and other nations on their railroad problems. And now Robert M. Phinney of 85 Summit Dr. is

headed for Pakistan once more a railroad-expert. In Rochester Phinney is engineer of train operation for General Railway Signal Company. But he's going to the Far East as a technical emissary for Uncle Sam under the Point Four Program. He expects to spend four or five months studying the government-owned railroads in Pakistan and advising on how to improve the system. His traveling bags are ready, his passport papers are complete. His arms are aching reminders of recent shots for typhoid, scarlet fever and other diseases. He spent two weeks in Washington during August being briefed for the trip. Now Phinney is waiting only for a 'track's clear' signal from the U.S. Department of Commerce before taking off." — EUGENE H. RUSSELL, JR., 82 Devonshire Street, Boston 9, Mass. CARLE R. HAYWARD, Room 8-109, M.I.T., Cambridge 39, Mass.

• 1905 •

Bernard Beerman, III, who left M.I.T. at the end of three years to study law, was signally honored by the Massachusetts Bar Association in his selection to serve with other outstanding lawyers of the state in a special group being formed to defend persons charged with murder but without sufficient funds to engage counsel. Bernie has served as clerk of the aldermanic board of Chelsea, Mass., for 40 years.

The rest of our news is ample proof that the ranks are thinning. Robert E. Wise, I, died at his home, 5107 Tenth Avenue, Los Angeles, Calif., on September 23, 1949. Little has been heard from Bob since he left Hartford, where he was a member of the city water commission. Henry H. Fleisher, I, died in Philadelphia on November 13, 1949. Charles L. Rodgers, II, died on June 23, 1951, at his home in Highland Park, Ill. News of Charlie during the past several years has been secondhand, but we understand that he had been incapacitated for several years. Robert Fowler died at Winthrop, Mass., during August, 1951. Bob had also been incapacitated and confined to his bed for years, but he always maintained his interest in the Class, paid dues, and so on. Asa H. Nuckolls, V, died at his home in Wheaton, Ill., on August 31, 1951. The New York Times of September 2, carries this obituary: "Asa H. Nuckolls, retired chemical engineer of Underwriters' Laboratories, Inc., and an authority on safety, died Friday at his home near Wheaton, Ill., at the age of 70. Born in Springfield, Tenn., he was graduated in 1900 from Ouachita College and later studied at . . . Technology. At the age of 50, he re-entered school, studying atomic structure and radioactivity at the University of Chicago. Mr. Nuckolls joined the staff of Underwriters' Laboratories in 1906 and retired in 1946. He served as a consultant to the organization until 1950. A registered professional engineer in Illinois and California, he was a member of many technical committees of the American Chemical Society and the National Fire Protection Association. As chairman of a committee of the American Society for Testing Materials, Mr. Nuckolls developed the method of ignition adopted as

standard by the American Standards Association in 1932. During World War II, he was a member of the explosive chemistry advisory committee of the Ordnance Department, safety and security branch. Mr. Nuckolls' published works included a variety of subjects from problems associated with fire extinguishing to explosion hazards of ammonium nitrate. He is survived by his widow, Helen; a daughter, Mary Elizabeth, and a son, John Hopkins Nuckolls." James F. Fouhy, I, died at Brooklyn, N.Y., on September 16, 1951. Some of us had seen Jim on a visit to Boston at about Alumni Day time, finding no indication of serious ill-health, although at reunions for several years we knew that he had been forced to slow up on physician's orders. The first 10 years of Jim's life after graduation were spent in the design and construction of sewers; first in Boston, with Metropolitan Water and Sewage Board, then with the Rapid Transit Railroad Commission and Public Service Commission of New York. During part of this period he taught at the Brooklyn Polytechnic Institute. During World War I, Jim was chief engineer for the government in shipyard operations on Staten Island; later he was evaluation engineer with the Standard Oil Company of California. In 1933 he received a bachelor of law degree from St. Johns' Law School, was admitted to the Massachusetts Bar, and also qualified to plead before the United States Supreme Court. He was personally responsible for the New York law requiring the licensing of professional engineers in that state. Surviving are his wife, Helen (whose company we were privileged to enjoy at several reunions), two daughters, and a son.

The notes are not only an evidence of the fact that time passes on, but of the extreme difficulties class secretaries have of getting news of living members. More active attempts will be made to prod non-corresponding classmates to tell us the things they do—their hobbies, their grandchildren, classmates met in their travels—so that the theme of future class notes may be less gruesome. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, Plymouth, Mass.

• 1906 •

On November 14 your writer was very pleased to receive a letter from President Coes, most of which is reproduced below: "We have been away almost continuously since the latter part of June. I was a delegate to the Ninth International Scientific Management Congress at Brussels representing, as Executive Vice-president, the National Management Council of the United States. I resigned as an officer of the Council on July 31. Then Agnes and I made a tour of Denmark, Sweden, and Norway, which we have never visited before, crossed the North Sea to England, and came home from there. We were the victims of an unusual marine accident while crossing the North Sea. A wild wave broke through the porthole dead-light in our cabin, and deluged us with shattered glass and sea water. I got a nasty cut on my left wrist from a piece of flying glass. The wound had to be sewed

up when we docked at Newcastle, England. If you have never been washed out of your bunk and bombarded with broken glass in the middle of the night, you can have no idea what an experience that was. Fortunately Agnes was not cut but only water soaked. We saw the Kon-Tiki raft at Oslo and that was most interesting. Have you seen the movie and read the book? If not, do; you both will be well rewarded. The scenery, particularly in Norway, is bold, grand, and breath-taking in spots. Now for business. I am in accord with your plan for the class notes. With regard to plans for the 50-year reunion, can you find out what the organization setups were for some of the 50-year class? What committees did they organize? I suppose that an over-all committee, a funds committee and an arrangements committee may have been some of the machinery used. Were the funds committees set up regionally, and so on? After we have some idea what the organization should be and a few of us have agreed on it, we can then consider how to man the organization. Can you insert in some issue of the class notes my greetings to the members and state that we are actively considering plans and organization for the 50-year reunion and that they will be advised from time to time about them; that, in the meantime, we would welcome any ideas and suggestions they may have with the view of making our 50th reunion an outstanding affair?" The Secretary had a feeling that Harold was away or he would have heard from him sooner regarding his new responsibility. It is gratifying to know that he is right on the job and already thinking about 1956. It was thought that the president's greetings to the Class could be conveyed most effectively by his own words as expressed in his letter.

Special! Extra! Have just received a small folded card inscribed on the front as follows: "Miss Carla B. Litchfield." Inside is written, "Mr. and Mrs. Andrew Kerr, married November 20th, 1951." On the last page is a note: "Dear Jim; I am a married man now; winter home 81 Warren Avenue, Plymouth, Mass.; summer, Barnstable, Mass. — your classmate, Andrew Kerr." I am sure all classmates will join the Secretary in wishing Mr. and Mrs. "Andy" every happiness in their marital state. — Frank and Mrs. Benham took an auto trip to Connecticut about the middle of November and while there called on our classmate, Joseph N. McKernan, I, in Plainville. He is the superintendent of the Plainville Water Company. He told Frank he was prevented from attending class reunion, as the meetings of the American Water Works Association occur at the same time as our gatherings. Ralph and Christine Patch report that they arrived at their Florida home in Winter Park about November 1st. — JAMES W. KIDDER, *Secretary*, 215 Crosby Street, Arlington 74, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

• 1907 •

Through a note dated November 1, 1951, from Mrs. Ethel M. Bitler, 5316 Chancellor Street, Philadelphia, Pa., I learned of the death on October 5 of her

husband, our classmate Elmer R. Bitler. He was associated with our Class in the Course in Civil Engineering, but I have never known anything about his doings since 1907. — Some time during December, 1950, Edward A. Drugan died. He was affiliated with '07 in the Course in Mineral Engineering. Aside from the fact that at one time he was an insurance adjuster with Aetna Life Insurance Company, I know nothing of his activities. His address at the time of his passing was 72 Strathmore Road, Brighton 35, Mass.

As of November 20, the following men have notified me by postal card that they are "definitely planning" to attend our 45-year reunion on June 20-22, 1952, at Oyster Harbors Club, Osterville, Mass.: Bob Albro, Dick Ashenden, Clinton Barker, John Bradley, Harry Burhans, Howard Chase, Kenneth Chipman, George Crane, Paul Cummings, Fred Dempwolf, Chick Eaton, Harold Farrington, John Frank, Tom Gould, Hud Hastings, Herbert Hosmer, Stud Leavell, Roy Lindsay, Frank MacGregor, Milton MacGregor, Alex Macomber, Howard Marvin, Sam Marx, John Mather, Howard McChesney, Harry Moody, Tucky Noyes, Bill Otis, Maurice Pease, Bob Rand, Don Robbins, Oscar Starkweather, Phelps Swett, Chet Vose, Willis Waldo, Phil Walker, and of course I expect to be there myself. The following have written that they hope to attend: Gene Banfield, Jim Barker, Carl Bragdon, Allan Cullimore, Parker Dodge, Herbert Eisenhart, Wheaton Griffin, Ralph Hudson, John Kinnear, Albert Mansfield, Ed Marsh, Floyd Naramore, Kelly Richards, Carl Trauerman, Arthur Tylee, and Edbert Wilson. Looks like quite a party! Better make your plans to attend if you haven't already done so.

The following news items or address changes have come to me directly from the various men: Jim Barker is at 3245 West Arthington Street, Chicago 24, Ill. Carroll Dean, 100 East Underwood Street, Chevy Chase, Md. Carl Bragdon has partially retired from Interchemical Corporation after nearly 37 years with this concern, and is now doing some consulting work and also water-color painting. His home address is 4 Rock Ridge Road, Larchmont, N.Y. Kenneth Chipman retired in 1949 from the Bureau of Geology and Topography of the Dominion of Canada after more than 41 years in government service. His home address is 173 Stewart Street, Ottawa, Ontario, Canada. John Donaldson is at Veterans Hospital, Fargo, N.D. Kirk Dyer, with a mailing address of Post Office Box 432, Cromwell, Conn., has for 20 years been associated with A. N. Pierson, Inc., the largest wholesale florists and nurserymen in the United States. He wrote me last October that he recently had had a sail out of Larchmont (N.Y.) Yacht Club with William Henry Bradshaw of '07. — Tom Keeling's present address is 143 Ensworth Avenue, Nashville 12, Tenn. Ralph Knight, 81 Lovett Street, Beverly, Mass., retired on January 1, 1950, as director of research for the United Shoe Machinery Corporation. Ed Lee moved from New England during November because of the very poor health of his wife. His ad-

dress is 1020 Woodside Avenue, Fort Myers, Fla. Harry Moody, who is retired from active business, is spending a good deal of time on his hobby of music and harmony. He lives at 25 Richard Road, Lexington, Mass. — Bill Otis says that he visited Wheaton Griffin last June and "found him more handsome than ever." Willis Waldo, Post Office Box 1685, West Palm Beach, Fla., wrote last November that he was just about to complete his first plant for the decortication of ramie and hemp fibers.

Now is the time to contribute to the M.I.T. Alumni Fund if you have not already done so. — BRYANT NICHOLS, Secretary, 23 Leland Road, Whitinsville, Mass. PHILIP B. WALKER, Assistant Secretary, 18 Summit Street, Whitinsville, Mass.

• 1909 •

Many may have wondered what has happened to Art Morrill, XI, who returned to the United States from China last spring after the Communist regime had taken over. As you all know, he has spent most of his life since graduation doing useful and humanitarian work by installing sanitary works and improving health conditions there. His experience and accomplishments can well be followed in the several comprehensive letters which he has sent in recent years for inclusion in the class notes. We recently received another interesting letter from Venezuela where he has gone to continue his good work, and we all know that South America needs a lot of assistance in sanitary engineering. Art writes: "Your letter of April 10 reached me in Detroit just a couple of weeks after I first heard that the Venezuelan National Institute of Sanitary Works was looking for a consultant on water and sewage treatment plant design. I left New York by sea on May 25, and here I am. It looks as if the work is going to be very pleasant and interesting. Caracas is 3,000 feet above sea level which gives it a delightful cool climate, even though it is close to the equator. The seaport, La Guaira, is only seven miles away in an air line, though three times as far by the picturesque mountain road. It is pretty hot and sticky, but the weather is beautiful here. The house I am living in is almost at the foot of a huge mountain that goes up to 6,000 feet. I face it every morning eating breakfast and the upper part is usually out of sight in the clouds, with thin wisps of the bottom of the cloud drifting along the lower slopes of the mountain. The scenery is very easy to take.

"Many of the Venezuelan engineers in our institute studied in the United States and speak English pretty well. It would be a great help in living, however, to know Spanish, so I am trying to learn some. I have found a place to live with a fine little Venezuelan family, which I hope will help in the Spanish-learning process. I am also taking two lessons a week. I see a good deal of written Spanish at the office and was able to make quite a lot of sense out of it, even at the start, from what I knew of French and Italian. The gentleman of the house where I live is a doctor and he speaks

English quite well, enough to help me out in an emergency. If I have time, however, or if he is not at home, I retire to my room and dictionary and try to manufacture a sentence or two in Spanish to say to the lady of the house. She is a fast talker when she is going her own gait but she kindly co-operates and speaks very slowly if she has something to say that I ought to understand. Quite often I can get most of what she says. In a pinch we call on the tall, 13-year-old daughter, who is studying English and can already carry on simple conversation. The institute builds and operates water plants all over the country, but a big job they are in a hurry about right now is a filtration plant for Caracas, where the water supply is pretty turbid after hard rains on the mountain watersheds."

We are more than proud of three of our classmates, each of whom has already been highly successful and has recently been rewarded by promotion to higher responsibilities. We have reported previously in the class notes that George M. Gadsby, V, had been made president and general manager of the Utah Power and Light Company. This past summer he was elected president of the Edison Electric Institute, which is a large fact-finding organization for the electric power industry and embraces almost all the important utilities in the country. Quoting from the *New York Times*: "Mr. Gadsby is well known throughout the nation both in the electric industry and in other business fields. The western utility which he has headed twenty-two years has developed during that time from a relatively small and limited concern into a forward-looking public service company supplying power to a rich region whose economic possibilities only now are beginning to be realized."

Johnny Nickerson, II, has just been appointed to a key post by the Economic Cooperation Administration in which he will be senior consultant on the ECA's productivity and technical program. He believes that at the present time his duties in Washington and traveling around will take, on the average, two or three days each week. The first step in his new position will be to line up some personnel to help with the program, to act as consulting engineers to European industry, to increase productivity, and speed up defense work. European specialists will visit the United States to study our methods of production. Johnny will advise the director of policies in the selection of industry consultants and will acquaint American industry with the progress. From time to time we have already chronicled Johnny's progress from an executive position with Cheney Brothers to his appointment by President Roosevelt to the Textile Work Assignment Board and then to the Textile Industry Committee under the Fair Labor Standard Act. Early in the war he joined the War Production Board and right after the war went with Johnny Willard, II. Since 1949 he has had his own consulting offices in Hartford, Conn. The *Hartford Times* devotes a two-column headline to Johnny's being named top ECA consultant, with his picture at the top.

Louis Jacoby, VI, who is a native of Texas, has joined the Dallas branch of James E. Bennet and Company, Chicago, brokers in commodities and securities. After graduation he was associated for several years with the Westinghouse Electric Corporation as manager of the Houston, San Antonio, New Orleans, Charlotte, and Dallas branches. Later he entered the banking business in Dallas becoming manager of the Chase National Bank's office there and later in Chicago. We all remember Louis as a star baseball player on the '09 team, and the Dallas, Texas, *News* alongside his picture states that he has been an enthusiastic amateur golfer, and has won the state amateur golf championship in the 1920 tournament held in Houston.

We were greatly surprised to receive from the Alumni Office a notice of the death on November 10 of Ramon Munoz, III. There were no further details except that his address was Monterrey, Mexico. In the next number of *The Review* we will report whatever information we can obtain in the meantime. Our surprise is due to the fact that Ramon was such an enterprising, energetic individual, who pushed M.I.T. activities in Mexico to the limit and was always on hand here in the United States when we held important reunions. He was most active at our 40th reunion and we were told that, at the meeting of the Honorary Secretaries that year, he stole the show recounting his activities and experiences in Mexico. (See November, 1949, *Review*.) He was an Honorary Secretary and founder of the Technology Club of Mexico, and for some time was its president and only member, or so he said. He has had many thrilling experiences. We understand that in World War I he was taken prisoner by the Germans and barely talked himself out of being shot as a spy. Only a little over a year ago, he was a guest of Ben, II, and Barbara Pepper at their summer home at Hingham, Mass., and we had a most pleasant telephone conversation with him. Ramon was a partner in a successful mining project and made frequent business trips to the United States and Europe. It seems a coincidence that our two Course III men, Ramon and Garnett, Joslin, both of whom came long distances to attend the 40th reunion, and both of whom were successful mining engineers in Mexico, should have passed away within such a short time of each other. — PAUL M. WISWALL, *Secretary*, 20216 Briarcliff Road, Detroit 21, Mich. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHAREFF, 366 Madison Avenue, New York 17, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

• 1911 •

In sad contrast to the joyful note on which we opened last month's class notes, we mourn the loss of a faithful, loyal classmate, in the passing on October 23 of Stanford H. Hartshorn, X, treasurer and active head of C. H. Hartshorn, Inc., baby carriage and furniture manufacturers, former president of the City Council, and long prominent in the business, banking,

religious, and fraternal life of his native Gardner, Mass. He had been in ill health for several months and since early October had been a patient at Phillips House, Massachusetts General Hospital, Boston, where the end came. Graduating from Gardner High School in 1907, Stan at once entered M.I.T., and while there took part in campus life, being an active member of the Technology Club and the Chemical Society. He received his S.B. degree in Chemical Engineering. He declined a staff appointment to become associated with the Great Northern Paper Company at its Millinocket, Maine, plant as a chemist. In 1913 he returned to Gardner to join the firm of C. H. Hartshorn, Inc., founded by his father who was a leader in Republican circles, serving several terms as representative and senator on Beacon Hill, and who died in 1946 in his 87th year. The elder Hartshorn's interest in politics left operation of the plant largely to Stan, and under his direction it has become nationally known in the baby carriage and living room furniture fields. In 1928 Stan entered the political field himself and was at once elected to the City Council, where he continued to serve through 1937. Speaking of his political services, the *Gardner News* said: "During his 10 years in the city's governing body, Mr. Hartshorn was never opposed at the polls, a testimonial to his district's valuation of his service. The bulk of his time in the council was spent on the important public service and finance committees. A conscientious worker with a keen grasp of business details and unusual foresight, Mr. Hartshorn was responsible for many of the improvements made during the decade he was in the council."

A past master of Hope Lodge, A.F.&A.M., Blue Lodge, Stan was also a member of Gardner Royal Arch Chapter, R.A.M., a past commander of Ivanhoe Commandery, K.T., and a former member of Aleppo Temple of the Shrine, Boston. He also was a member and a former director of the Gardner Chamber of Commerce, a corporator of Henry Heywood Memorial Hospital and an active Rotarian. He was a past president of the Gardner Boat Club and held membership in the Oak Hill Country Club, Fitchburg, the Associated Industries of Massachusetts, the American Numismatic Association, and the Newcomen Society. He was also an active member of the M.I.T. Club of Central Massachusetts and took an active part recently in the Development Fund campaign. A lifelong member of the First Congregational Church of Gardner, Stan had been chairman of its board of trustees for several years and was also a vice-president and trustee of the Gardner Savings Bank, a member of its board of investment and chairman of the auditing committee.

On October 26, 1916, Stan was married to Julia Krantz of Washington, D.C., and Stan and Jule had hoped to celebrate their 35th anniversary with an open house at their home, 60 Highland Street, Gardner. Fortunately, they were able to attend our 40th reunion at Snow Inn, Harwichport, in early June. In fact, they so enjoyed themselves and the Inn that they

had a repeat week-end trip there in late August. Also surviving Stan are his mother; a son, Stanford H., Jr., now associated with C. H. Hartshorn, Inc.; a daughter, Mrs. Barbara Silva of Boston; a brother, C. Henry Hartshorn, president of the firm; and a sister, Mrs. Clinton J. Underwood, both of Gardner. We have lost a sterling member of the Class.

For some reason we had but an even dozen '11 men at this year's annual "Seven Come '11" dinner at Walker Memorial, M.I.T., on November 7th. A driving rainstorm all day kept away four classmates who had planned to attend. What we lacked in numbers we made up for in a most interesting talk-around, featuring a fine talk by Emmons Whitcomb, X, on a recent European trip from which he and his wife had just recently returned. Reta and Whit's trip centered about a convention of the American Society of Travel Agents in Paris, France, during the week of October 21st, at which Whit, as chairman of a national committee, had a report to make. Starting early, they made it a combined vacation and business trip, flying first to Glasgow and then to Edinburgh. Realizing a longtime ambition, they traveled on the crack train — *The Flying Scot* — from there to London and had an interesting four days there. From England, they flew to Copenhagen, Denmark, following which they made a five-day leisurely tour of several German cities, visiting Hamburg, Frankfurt, Heidelberg, Goetenburg and Munich. Then, following three delightful days in Switzerland, they finally reached Paris for the travel gathering. The return trip to Boston was made on a transatlantic strato-liner.

John Alter, IV, practicing architecture in Lawrence, Mass., has been active there in the low-income housing program for more than three years now. The original project was a series of four-room Cape Cod houses in three locations, then followed by a series of apartment buildings; and, finally, they are now engaged in the erection of some three-story apartment units. John also reported considerable activity in school work and commercial buildings.

Obie Clark, II, who heads the Nelson Cement Stone Company in Quincy, reported that the company is now enjoying its best year in volume and profit to date. Currently he is "fooling around" with prestressed concrete, having taken a special summer course at M.I.T. this year. In this field the company is now working on a new grandstand for the University of Connecticut at Storrs, Conn., where a new design is intended to save \$4 per seat on 11,000 seats — a worth-while saving. Obie is also vice-president of the Quincy Cooperative Bank.

Marshall Comstock, VI, is still active and busy with the Wagner Electric Company, Boston, and he and Helen have five grandchildren. Your Secretary, still secretary-manager of the Gardner Chamber of Commerce, finished one up on Marshall, however, as he and Sara have six grandchildren. Dennie was also proud of the fact that a first-time city-wide community fund, of which he is secretary, was on the threshold of success. (Five days later it

was announced that the 1951 Gardner United Community Fund was "over the top" by \$315, in its quest of a goal of \$63,100.)

We were all glad to hear from Tommy Haines, II, vice-president and associate director of engineering and operation of the Boston Edison Company, that his wife, Mildred, is somewhat improved, with hope of more complete recovery from her long illness. They have two grandchildren. Jack Herlihy, II, another Boston Edison veteran, now vice-president and assistant general manager, said Mabel had had a fine summer and they now have five grandchildren — four boys and a girl. Hal Jenks, VI, still with New England Gas and Electric in Cambridge, reported that he and his wife had recently bought a place in New Ipswich, N.H., for summer use at present, but their eventual home, they hope. They have four grandchildren. Roger Loud, VI, district sales representative of Boston Edison, has completed 36 years with the organization. He and Esther had an enjoyable air trip to Minneapolis this summer, where they visited their older son and his wife and baby daughter, going via Detroit and returning via Chicago and New York. Their younger son graduated from M.I.T. last June in Biology and Public Health and is now working in the biological laboratory at Massachusetts General Hospital, Boston.

Morris Omansky, V, consulting chemist specializing in rubber chemistry, gave us a very interesting story on a recent litigation case involving the Standard Oil Company of New Jersey, in which he was a government witness in a case tried in the little-known Customs Court. The three principal phases of his work, he said, are research, development, and litigation. He and his wife have three grandchildren.

Carl Richmond, I, said he and Helen haven't reached the grandparent stage yet. Their oldest boy is a junior at Harvard and currently is varsity manager of football. Their middle boy is in his first year at Tufts Engineering School, while their eight-year-old boy has just become a Cub Scout. Following Emmons Whitcomb's talk on transatlantic flights, Carl gave us a most interesting account of the fine work the Coast Guard is doing with its five weather-ships in strategic positions in the Atlantic Ocean as a guide to weather conditions for flyers. He also told us that Harold Lord, II, had an appendectomy at Symmes Arlington Hospital on October 3, from which he returned home on the 16th and hoped to be back at work by mid-November.

Aleck Yereance, I, completing the dozen present, said he had just celebrated his 25th anniversary with the Prudential Life Insurance Company in Boston and was busier than ever in his work on real-estate loans. He and his wife, who live in Wellesley, have three grandchildren. We were all so sorry that the inclement weather had kept George Cumings, VI, at his home in Winchester because of a slight cold. George has had a fine recovery from the heart attack which prevented his anticipated attendance, as always previously, at our June five-year reunion. He had retired, you remember, in

early spring after nearly 40 years' service with New England Telephone and Telegraph.

Cal Eldred, VI, represented the Class at the memorial services for the late Dugald C. Jackson, Head of the Electrical Engineering Department in our days, and for years thereafter. Cal wrote: "I have great regard for 'D.C.,' not only from undergraduate days, but also from the two years when I was research assistant in Electrical Engineering after graduation. It was an experience that I have always greatly valued. Jackson was a great engineer and a good friend."

President Don Stevens sent best wishes to all at the class dinner, reporting that, at that time, he hoped to be in Bermuda with his daughter, Lois. O. W. Stewart, I, had also planned to attend, but an important meeting in his home town of Kingston was called suddenly that evening, and he felt he must attend. In sending regrets, Frank Wood, II, for many years with the Salem, Mass., Gas Company, said that he and his wife are "now permanently ensconced at 3 Rosemary Lane, Durham, N.H., which makes it rather difficult to get home after such parties, as I do not drive at night."

Had a fine letter from Helen Van Tassel, Ted's widow, following receipt from me of a copy of the pictorial post-reunion issue of *Theleverer*, in which she said: "It was so nice to have a chance to look at the old friends in the pictures, and to read Jim Duffy's priceless 'log' bringing memories of so many nice things about them." She also reported that Russ Harmon — now Captain Harmon, U.S.A. — came home from Korea in the late summer, and, after 30 days, he and Nancy and their two boys left for Barbadele Field, Louisiana, in mid-October. "The house [15 Ives Street, Beverly, Mass.], she continued, "seems very dull right now, as Nan and the boys were with me during the 15 months Russ was overseas. Ted seemed very near as I looked at those pictures. I try to keep busy and look ahead not back, as I know Ted would want me to do. But he was a guy that left a big empty space." We know it, Helen.

John Taylor Arms, IV, Fairchild, Conn., architect, etcher, and flower expert, gave a lecture on October 18 on "Design in Flower Arrangements" at the St. Charles Avenue Presbyterian Church in New Orleans, La. He appeared under the auspices of the New Orleans Garden Society, Inc., which said in its announcement that "no other American printmaker has reached as wide an audience." John is still president of the Society of American Etchers, Gravers, Lithographers and Woodcutters, a post he has held for most of the past 25 years. He also has been credited with executing "the most minutely etched plates ever attempted in American printmaking."

Here are three new addresses: General George C. Kenney, I, President, Arthritis and Rheumatism Foundation, 23 West 45th Street, New York 19, N.Y.; Howard R. Schulze, IV, 345 East 57th Street, New York City; and Franklin M. Stibbs, XI, 777 Maple Street, Wethersfield 9, Conn.

Here's a hearty hope that 1952 has everything fine in store for all loyal '11

men and their families. Don't forget to send in that pledge to the current Alumni Fund at M.I.T., and when you think of it, better "Write to Denniel" — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

• 1912 •

Pierre Drewsen, who won the Republican nomination for mayor of Northampton, Mass., carried the city by an overwhelming vote on election day. This is a signal triumph as Northampton is normally Democratic. Pierre's platform of sound business management for the city won him many Democratic votes. Anybody passing through Northampton, please call at City Hall and congratulate Pierre.

Roy Glidden, Vice-president of the American Society of Civil Engineers, was in New England this summer attending a meeting at Tufts College, and took the opportunity to visit old friends in Somerville. Our only regret is that you didn't give us a ring, Roy, as we certainly should like to have seen you. — Dick Stickney, who is retired from the U. S. Army, living at 51 Elm Street, Stoneham, Mass., writes to say that his son Alfred graduated from the course in airplane maintenance and engineering at Wentworth Institute. He is now in Antonio, Texas, with Slick Freight Airways.

Jerry Hunsaker, chairman of the National Advisory Committee for Aeronautics, was awarded the 1951 Wright Brothers Memorial Trophy, which is given annually for "Significant Public Service of Enduring Value to Aviation." The presentation was made at a dinner in Washington, D.C., on December 17. — The Davis Reunion Committee announces that we will get together at Snow Inn on Cape Cod, Friday, Saturday, and Sunday, June 6, 7, and 8. Alumni Day at Cambridge comes on Monday, June 9, with the dinner that night at the Hotel Statler. You will hear more about this later, but now is the time to mark up your calendar and save the dates. — FREDERICK J. SHEPARD, JR., *Secretary*, 31 Chestnut Street, Boston 8, Mass. LESTER M. WHITE, *Assistant Secretary*, 4520 Lewiston Road, Niagara Falls, N.Y.

• 1913 •

Allen Brewer, III, is an editor (for Technical and Research Division of Texas Company); that probably explains why he comes up blithely every year with something good for our notes, presently: "It's lucky I have a cold and have orders (from Mrs. B) to take things easy today. This has given me a chance to go over my unanswered mail, and, Lo and Behold! — I find yours of January 16. Guess I'm slipping. I'm generally very prompt and answer within three months anyhow. Well now for some personal news. Early this year I became a grandpop for the third time, but all in the same family. My eldest son Allen F., Jr., had a daughter this time. So far the other two backsliders are too busy building a house (for one), and trying to finish an agriculture course at the University of Kentucky (for the

other). As to honors and publications, I was elected eastern regional vice-president of the American Society of Lubrication Engineers for a second term last April. In addition, I shared with one of our other Texaco boys in working up a paper on gear oil additives. I also wrote the chapter on lubrication for William F. Staniar's new handbook on industrial plant machinery. There's no other real news except the Jersey striped bass are beginning to run. Of course we don't get fish down here as large as they do around Cape Cod, but by using a light glass rod and a nine-thread line we manage to give even a 10 pound'er a sporting chance, until we can crack him on the head in the surf. Anyhow, it keeps me young and out of trouble chasing lost golf balls." Allen Brewer, Jr., is really outstanding among the few people in this country who devote themselves to drawing and painting race horses. Young Allen is a graduate from Yale's Professional School of Fine Arts. At Yale he bought a dead horse from which he made over a thousand sketches involving anatomy and muscles. He does advertising art work for race tracks, and most of the leading race horse farms. The Newark, N.J., *Evening News*, of December 28, 1950, showed three of his paintings: "Citation," "Man O'War," and "Lesson," which shows a mare teaching her foal how to run.

It was good to hear from long-silent Clint Pearce, II, professor of machine design at Kansas State College, via William A. Ready: "Although I am the world's worst correspondent, I finally 'take my pen in hand.' Alumni Day is always too late or early for me to attend, since we close here before Memorial Day, and I have to get to Washington, D.C., as soon as possible thereafter. I was with the Naval Ordnance Laboratory from May '44 to August, '45; and since then we have formed the habit of summer employment. So I report the first of June for my fourth consecutive tour of duty as a mechanical engineering consultant in the Mine Section. (And I like to keep my finger in the pie to see what is being cooked up for the ungodly.) Since the laboratory is working six days a week, it looks as if I will not be able to get away. Perhaps two years from now? The rush of G.I. training here is just about over, but we are holding our breath to see if this new 'World War 2½' will overload our facilities again. In the lighter vein: I have two grandchildren who live in town here; the college basketball team was fairly successful; our former president went to Penn State; and Kansas is not the wilderness some of our eastern friends think."

Paul Cogan, II, writes: "I have been intending to write to you for over two years for I do enjoy your class notes, but nothing of importance to the other members of our Class seems to turn up. True when we opened up the \$20,000,000 campaign in the Lehigh Valley I saw Bob Weeks go into action at the kickoff dinner. When Louis Wilson remarked that one member of the Class of 1914 equalled four 1913 men (that being the ratio of those present), I think Bob convinced Louis he was in error. I have successfully passed a rather serious operation and built a new

home during the last two years, so am in pretty good shape and will be glad to see any classmates who may travel down this way." From Arnold Wahl, V, in Chicago: "The past few years has found me very busy developing the extension department of the Wahl Institute of Technology (W.I.T.). We have published a home study course in brewing and malting technology which has proven popular in supplying the needs for those who want to learn but can not attend the resident course. More personal is the fact that my boy and girl, Arnold Christian, 14, and Rosemary, 15, are both preparing in high school for their entrance to M.I.T." The Houston, Texas, *Chronicle* of July 2, 1951, published the following on the subject of "Franzheim's Big Mistake": "The biggest mistake Architect Kenneth Franzheim ever made was waiting so long to come to Houston. So says Mr. Franzheim who today, at the age of 60, is one of the best known architects in this part of the country, and has designed such buildings as Foley's, the new Hermann Hospital, Hermann Professional, the Oil and Gas Building, and the Gulf Building. Mr. Franzheim decided early in life to take up architecture. 'I think I was about 10 when an old colored servant of ours told me it must be fun to be an architect. I decided if he said it was fun, then it must be,' he laughed. The son of a Wheeling, W.Va., manufacturer and banker, he spent his boyhood in Wheeling. In 1913, he received his degree in architecture from . . . Technology. Shortly after he graduated, he went into the service and was commissioned a first lieutenant in the air force. It was during that time that he first came to Houston—in 1918—along with a group of officers who were to open Ellington Field as a bombing school. Officer in charge of bombardment, Mr. Franzheim wrote the first textbook on aerial bombardment used at Ellington. It was while he was at Ellington that he met, and in 1919, married the former Bessie Sims. The couple have three children, Mrs. S. A. McAshan and Kenneth Franzheim II, both of Houston, and Mrs. B. F. Kitchen of Connecticut. When he left the service, Mr. Franzheim and his wife went to Chicago, where he opened his first office. It wasn't long before he also opened offices in New York, Boston and Washington. And, since coming to Houston 15 years ago, he has by no means confined his work to this locality. During World War II, he designed a \$52,000,000 permanent housing center for the Defense Home Corporation in Washington, D.C. And his was one of the first architectural firms to lay out airports. A fellow in the American Institute of Architects, Mr. Franzheim is also a former president of the Houston chapter. He is a member of the Chamber of Commerce, and a member and past director of the Houston Country Club, Bayou Club and Ramada Club. Though he is kept pretty busy here, Mr. Franzheim and his wife still find time, once a month, to fly to their Mexico City home, which they bought five years ago. And Mr. Franzheim collects antiques for his home 'Wayside,' at 906 South Wayside Drive, and raises dogs on the lawn of

his office—a lovely manor house at 2306 Crawford."

The paragraph which follows is from a recent article in the Boston *Herald* about the Plymouth Cordage Company: "A company is no better than the man who heads it. Ellis Wethrell Brewster is a man of great integrity who loves being the president of the concern and who works terrifically hard at his job. People who surrounded his ancestor, the Elder Brewster of the first Plymouth Colony, would not look at him as a modern if they saw him puttering around with a musket. He has a determined, ruddy face, a direct way of talking and a lot of brimstone in his nature. He came up the hard way through the factory starting in 1915 at \$75 a month." Edward T. Dobbyn, VI, a naval architect and attorney-at-law at Quincy, Mass., was recently made senior civilian in administrative charge of hull, electrical, and mechanical division in the Fore River Shipyards.

Wylie J. Daniels, XI, died last October 3, at his home in Indianapolis, Ind.—FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 788, Pawtucket, R.I.

• 1914 •

Word has been received during the past month of the death of two of our classmates, Bill Brotherton and Herb Klipstein. William H. Brotherton died in Dallas, Texas, on September 7, after an illness which had confined him to the Methodist Hospital in that city. He had resided in Dallas for many years where he also had operated his own business. On June 1, 1916, he married Marie Dowell, and they had two sons, William H., Jr., and George D. Herbert C. Klipstein of Course X died in Fort Lauderdale, Fla., last October. As he was associated with '14 for only part of the four-year course, he had not taken a very active part in class affairs, although when he was located in New Jersey, he was heard from occasionally. In recent years, he and his wife, who survives him, have made their home in Fort Lauderdale.

Art Peaslee has again been appointed the Hartford, Conn., Technology Club representative on the Alumni Council. It is good to see him back in Cambridge for the monthly meetings. Art reports that his construction business is still running along nicely.

At the annual meeting of the Associated Industries of Massachusetts, held on October 25, your Secretary noted that Morrison, Derry, Corney, and Dawson were among those present; in fact, Skip Dawson is vice-president of the association. Skip is also a nominee for a directorship on the board of the National Association of Manufacturers. The actual election has not been held as these notes are being written.

Several inquiries have been received as to why Ross Dickson moved to Waban, Mass. It was all an error at the Alumni Fund office which processed the letter. Ross is still in Elizabeth, N.J., commuting daily as usual to Radio City where he is associated with Standard Oil as president of the Petroleum Distillation Corporation and assistant secretary of Standard Oil Development Company.

Tom Comber, who is professor of civil engineering at Johns Hopkins University, had a busy time this past June. Thomas F., Jr., graduated from the University of Maryland with a law degree, while his sister received her A.B. degree at Mount St. Agnes College in Baltimore. Another daughter, Madeline, graduated from Notre Dame Institute, also in Baltimore, winning a four-year scholarship to Mount St. Agnes College for excellence in her studies. — H. B. RICHMOND, *Secretary*, 275 Massachusetts Avenue, Cambridge 39, Mass. ROSS H. DICKSON, *Assistant Secretary*, 126 Morristown Road, Elizabeth, N.J.

• 1915 •

Isn't that second letter from Max another "lulu." It wrings tears, cheers, and dollars from you. Forget the tears, give Max the cheers, send him your dollars, and help him put the Alumni Fund over big for 1915. He's doing a fine job and he's a good man for the job!

I want to tell you about a class wedding, on June 9, in St. Patrick's Church, Watertown, Mass. Henry Sheils's daughter Theresa was married to John R. Huling of Hartford, Conn. A delegation from our Class attended and after watching Henry walk proudly down the aisle we went to the gay reception at the Hotel Beaconsfield in Brookline, where, although probably contrary to polite conventions, we gave Theresa and John, and Henry and May a regular M.I.T. cheer. We all had a most enjoyable time and wish this young couple all the best for a long, happy, and successful life. Later on we all went to the class party at the Vendome in Boston to continue the very pleasant day.

Typical, I suppose, of their aggressive part of our country, the M.I.T. Club of Southern California has an attractive letterhead listing their many officers. They must do an outstanding job out there. The energetic secretary, H. E. Beebe¹⁰, 1847 North Wilcox Avenue, Hollywood 28, writes: "All Alumni having California in their winter vacations should include January 26th, 1952 — the second national M.I.T. conference, 'Frontiers of Science,' to be held in Los Angeles. Visiting firemen are urged to notify me so they also can be included in the executive luncheons held the first Wednesday of each month." He also sent a letter from Hubert S. James: "I am leaving for Lima, Peru, on October 12 and expect to be gone about six months. During the war, I was six months at Eniwetok Atoll in the Marshall Islands on very interesting and original construction work for test buildings and shelters for the series of atomic blasts there this last spring. Most of this is still restricted information, but if you ever wish an atomic bomb shelter I can tell you how to build one; but I hope we will never need any here!" This is the first news we've had from Hubert James for many years. He could probably tell an exciting story about his war experiences.

Classmates attending the thirtieth annual convention of the American Association of Textile Chemists and Colorists at the Statler, New York, on October 17 and 19, were Ralph Hart, John N. Dalton, Albert E. Sampson, Alton A. Cook, and

myself. We looked around for Phoebe Proctor, also in the industry but couldn't find him. Many other M.I.T. men were there.

With an excellent picture of John, the Lawrence, Mass., *Tribune* of October 19 carried this story: "Recent advances in the Textile Industry" will be the subject of a talk by John N. Dalton, chief chemist of the Pacific Mills, at the monthly meeting of the T. C. Atchison Men's Brotherhood of the First United Presbyterian church Monday at 8 P.M. Mr. Dalton, by virtue of experience, is an authority on his subject. He is director of chemical research for the Pacific Mills, member of the American Chemical Society, Past National Vice President of the American Association of Textile Chemists and Colorists, past chairman of the New England Association of Textile Chemists and Colorists and a Fellow of the American Institute of Chemists. Available current information about new fibres, new blends of fibres and new production methods will be discussed by Mr. Dalton during his talk. He will also try to evaluate the future of the textile industry in Lawrence. As the economy of this city is primarily based on this industry, the answer to this whither-are-we-drifting question is of vital and timely interest to everyone."

Ray Stringfield writes from 2295 Normandie Avenue, Los Angeles 4: "It's amazing how the work and details stack up when you're away for three or four weeks, and I'm just beginning to get my nose out from under. . . . Spent two evenings with the Casselmans in New York and Merrette seems to be keeping him in very good repair. We had a delicious dinner in their apartment one evening, and the hard-boiled mamma refused him any second helpings. Chances are I'd be better off if mine did the same. Also, I spent a most pleasant day with Ray and Pat Walcott at their comfortable home in Cranford, N.J. Pat is president of her garden club and Ray likes to use a spade to keep his sylphlike figure under control; and their flowers are really something to see. Saw dozens of Technology men at the American Chemists Society meeting in New York (where there were over 16,000 registrants) and at several industrial plants I visited, but those were the only ones from '15. Hope we can see you next time I get back, and don't forget to look us up if you get out this way." We are sorry to have missed Ray and Lucile here, as it may be a long time before Fran and I are old enough for that long-cherished trip to the coast.

In addition to the good-looking prints of our 1950 Coonamesett Reunion that Wally Pike and Parry Keller sent you, Reggie Foster of Lowell, Mass., is sending prints of the pictures he took. We hope you like them and will always remember 1915, your classmates, and their good friendships. Many thanks to Reggie.

Notice, each month there are fewer and fewer notes. Help! Help! — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

• 1916 •

Welcome to the new year. May it be one with good fortune and good health for all.

All the way from San Leandro, Calif., we have a few welcome notes from Saunders Bullard who continues his interest in things of the sea. He writes: "Am at present employed by the San Francisco Division of Todd Shipyards Corporation in Alameda, Calif., in the engineering department. After my retirement from active service in the Navy (31 years, 10 months), I was employed by the Electric Boat Company, in Groton, Conn., and held the position of design director when I resigned in June, 1947. From that date until July of this year I did nothing but enjoy myself by selling a bit of life insurance in the Lincoln National Life Insurance Company."

From the account of an inquiring reporter in the New York *Herald-Tribune* on the occasion of General MacArthur's release from active duty, we noted that the reporter must have been selecting distinguished-looking pedestrians, for this is what we read: "David L. Patten, former chief of the E.C.A. special mission to Portugal and a former Navy Commander who was on Gen. MacArthur's staff in 1944 and 1945 — 'I hope he doesn't come back and stir things up. The country is stirred up enough already. These are times for sober judgments and long-considered opinions.'"

From Florida comes the following word from Lewis Dow, in response to a recent request for news: "I hope this letter reaches you in time for The Review. The other side of this sheet will give you some idea of the work I am doing (gas plant cost and analysis data). This plant has a capacity of approximately 6,000,000 cubic feet per day (send out), although we very seldom reach that figure. I am eligible to retire but I intend to continue working for three or four years more. I have a log cabin near a lake about 40 miles from St. Petersburg, so you can readily see where I spend my week ends. Living in St. Petersburg is ideal for those who have a steady income. With practically no industries here, you can draw your own conclusions as to what chances a 'graduate' has. Mrs. Dow has been with the Peninsular Telephone Company since 1925. I met her there in 1928."

Add Howard Hands's name to the long list of potential and real grandpas, for we have received word (early October) that his son Richard was to be married to Shirley Ann Devine in Royal Oak, Mich., on October 27. Bill Barrett still seems to be doing all right, as evidenced by an announcement of the president of the Metropolitan Life Insurance Company in August: "I am pleased to announce that the Board of Directors has this day appointed William J. Barrett the Secretary of the company. Prior to this Mr. Barrett was Third Vice-President in charge of the Publication Division, which assignment will be included among the duties of his new position." Congratulations, Bill!

Your Assistant Secretary had a pleasant visit with Lewis Carman while in Los Angeles in August. L.A.C. is manager of the Los Angeles office of John F. Forbes and Company, C.P.A. He has been a consistent mountain climber and skier for years and outlined his plans, to take effect a week later, for a lonely 22-mile hike

down into and across the Grand Canyon from the north rim to the west rim, while his wife and friends take a 160-mile automobile trip from the starting point around the canyon to meet him at the end of the trail. Recalling, and also only recently having observed, that the canyon is a full mile deep, we can loudly assert that there is plenty of stamina left in some of the gang.

On October 24, Bob Wilson presented to Herbert Hoover the Howard Coonley Medal of the American Standards Association at its luncheon meeting, ending a three-day session at the Waldorf Astoria Hotel in New York. The *New York Times* stated: "In presenting the Coonley Medal to former President Hoover, Robert E. Wilson, chairman of Standard Oil Company (Indiana), described how as a young engineer he had admired Mr. Hoover's work in starting standards programs." Bob also appeared in Boston recently at the 23d Boston Conference on Distribution, which was held at the Hotel Statler. He and 19 other experts discussed problems of distribution in an armed economy. Bob's topic was, "Progress in Petroleum Distribution."

Vannevar Bush was awarded a doctor of laws degree last June at Colby College. (Dr. Bush's book, *Modern Arms and Free Men*, was filmed on the Colby campus by the March of Time about a year and a half ago.) Here's a clipping from the *Boston Globe* in September: "Dr. Heinz L. Krekeler, Charge d'Affaires of the Federal German Republic, yesterday afternoon presented an honorary degree of Doctor of Engineering from the University of Stuttgart to Prof. Gordon M. Fair of Harvard University. In a ceremony which took place at Harvard's Pierce Hall, West Germany's top diplomat in the United States cited the 'friendship and gratitude of his people toward the sanitary engineering projects which Prof. Fair directed in their Country.' Prof. Fair is a scientific director of the Rockefeller Foundation as well as a member of the Expert Panel on Environment Sanitation of the World Health Organization. Both of these agencies have supported sanitary engineering projects in Europe under his direction." From a clipping in the *Buffalo, N.Y., News* of last May, we learned that Ted Jewett was elected a director of the Barcalo Manufacturing Company. This clipping noted that, in addition to being a vice-president and a director of Spencer Kellogg and Sons, Inc., Ted is a trustee of the Erie County Savings Bank, a trustee of the Buffalo General Hospital, a member of the Advisory Committee of Children's Hospital, and a director of the Municipal Research Bureau and the Delaware Avenue Association, all of Buffalo.

A press release from Infilco, Inc., Tucson, Ariz., recently was received and brought this interesting item about Harmon Keyes: "Harmon E. Keyes, chemical and metallurgical engineer formerly of Phoenix, Arizona, has joined the technical staff of Infilco Inc. as a special consultant. Mr. Keyes will devote himself primarily to the further development of the autoxidation process, a field in which he holds many patents. For several years Mr. Keyes was engaged in electrolytic

work, but 26 years ago he became active in the research and development of copper extraction processes, particularly production of ferric sulphate and sulphuric acid on a commercial scale. He later expanded his activities to include sewage, water pickle liquor and alkaline soil treatment applications of sulphur dioxide fixation by autoxidation. During World War II Keyes served in the Chemical Warfare Service with the rank of Major. He is now commissioned as a Lt. Colonel in the Chemical Corps, U.S. Army Reserve, and devotes his spare time to research and development activities of the Army reserve."

Here is a press release from the Southwest Research Institute of San Antonio, Texas, August, 1951: "A group of American scientific research authorities headed by Dr. Harold Vagtborg, president of Southwest Research Institute, has undertaken an exhaustive survey of West Germany's scientific research resources under ECA sponsorship, it was announced today. Primary objective of the group is to determine whether a need exists for establishment of applied research institutes to serve small and medium-sized manufacturers and processors in West Germany in the interest of national security and, if it does, how best to set up such laboratories. The American mission includes . . . Maurice Holland, New York industrial research management consultant. . . . The leader of the American mission said that the group's experience included assistance in establishment of similar industrial research laboratories in Norway, and development of a program leading to inauguration of a scientific institute in Brazil."

On July 14 of this past summer, Steve Brophy's daughter, Cynthia Ann, was married to John Luther Cleveland, Jr., son of Mr. and Mrs. Cleveland of Pelham Manor. The bride and groom planned to make their home in Marietta, Ohio, where he is with the Union Carbide and Carbon Corporation. — Allen Giles recently was a candidate for the School Committee in Melrose, Mass. We have not heard the official results yet, and can only hope that Allen came out on top. We did receive a clipping from the *Free Press and Home Sector* of Melrose which gives the letter which Allen wrote to the editor announcing his candidacy. We think you will find it interesting; here it is: "I should like to announce through the columns of your paper, my candidacy for School Committee in the City of Melrose. I am completing my 21st consecutive year of public service in Melrose, ten years on the Board of Aldermen, and the 11 years previous on the Planning Board. I was chairman of the Planning Board for 2 years, and President of the Board of Aldermen one year. Having been interested in the education of our young people since they are our future citizens, this seems to be a good opportunity to offer my services as a member of the School Committee, which has the responsibility of providing these facilities. We have been residents of Melrose for 22 years, building our new home at 62 Lovell Road in 1929. Our son and daughter were both graduated from Melrose High School. Our daughter, Dorothy, attended Wellesley College directly from

high school. Allen Jr. went on to get his Master's Degree at Boston University College of Music. He is now Minister of Music in the Amherst Community Church in Buffalo, N.Y. and a member of the faculty at the University of Buffalo. I am a graduate of MIT, and have been Chief Engineer at Longwood Towers in Brookline since 1935, in charge of maintenance. . . . My views on City Planning and City Government are well known to most of the citizens of Melrose. If elected to membership in the School Committee, it is my desire that the experiences gained through my services on the other Boards shall help attain a coordinated effort for the best good of Melrose as a whole."

The American Society of Civil Engineers recently elected its new officers for 1952. Among the five directors elected was our own Walt Binger. Biographical sketches of the newly elected officers appeared with the announcement of the election, and we would like to quote a portion from the sketch about Walt: "Mr. Binger's career has been divided into three equal time periods, covering (1) Consulting engineering and construction management; (2) charge of design and construction of large buildings in Manhattan for financial groups; and (3) commissioner in the La Guardia administration. In the latter capacity Mr. Binger organized and headed the engineering group, which designed and built the Coney Island and Ward's Island Sewage Treatment Works, sewage tunnels under the East River, and power-producing incinerators. He also organized and headed the group that designed and built the East River Drive; planned the Harlem River Drive; the Battery Underpass, etc. He has been chairman of the Citizens Traffic Action Committee credited with the law that took traffic control from the police and created a Traffic Department under a traffic engineer. . . . In 1948 he was appointed by Secretary of Defense Forrestal as consultant to the Office of Civil Defense Planning on preparation of the Hopley Report. . . . In 1941 Mr. Binger was sent to London as expert consultant to the Secretary of War to write a confidential report on engineering features of civil defense."

Joe Meigs recently announced the removal of his offices to 274 Madison Avenue, New York 16, N.Y. Hy Ullian recently opened another insurance office in Lowell, Mass. Horace Bickford has moved and his new address is Post Office Box 52, Jonesport, Maine. Carlin Harrington has moved from Grosse Ile, Mich., to 7622 Raydale Road, Hyattsville, Md. The new address of Harmon Keyes is 2120 East Silver Street, Tucson, Ariz. Richard Knowland has moved from Pelham, N.Y., to Goshen, Mass.

Izzy Richmond was in an automobile accident shortly after his return from his trip to Europe. The extent of his injuries is unknown, but we do know that he had to spend several weeks in the hospital convalescing. We are happy to report that we received word from Izzy's office that he was expected to return to work shortly (this was in October).

We are sorry to report that Dan Comiskey's mother passed away during

the past summer. We also received word that Henry Morse is, and has been for some time, seriously ill. There may be some who would like to write to Henry. His address is: 126 Independence Drive, Chestnut Hill, Mass.

That just about cleans up the backlog of news. From here in, we must look to the co-operative spirit of the members of the Class for material for future columns. On the basis of past performances, we feel certain that you will come through for us again. Your letters don't have to be long. Just send us a little note telling us how you are and some little thing of interest that happened to you in the past few months. We also would like to get your point of view on the idea of having another reunion in the early summer of this year. WRITE TODAY. — RALPH A. FLETCHER, *Secretary*, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York, N.Y.

• 1917 •

We do not know whether it was the balmy spring day (temperature about 70), interest in the reunion, or the announcement that his deanship, Mr. Brooks, would be the speaker of the evening which brought out the large crowd at the 1917 dinner on November 15, but it was a most successful party, although Penn could not be present since he had one of those important appointments. In this instance, it was really important — the wedding of his son Bob, a lieutenant in the Marines, who moved his plans ahead because of the sudden invitation to take a trip to Korea.

There were many lost souls present whom we have not seen for a long time, including Thompson, Eddy, Sawyer, Hutchinson, Colleary, Holton, and Wyman. Occasional attendees included Tuttle, Crosby, Swain, Chisholm, Crowell, Flaherty, Gargan, Holt, Logan, and Woodward. The regulars there were Hill, Dunning, Bell, Blanchard, Cochrane, and Lobdell. The necessary dignity was added by your president, secretary, and assistant secretary.

Bill Eddy spends a great deal of time outside of the country on important government projects. He is, therefore, partially excused for not showing up more often. Louis Wyman has retired from active business. He was with the William Underwood Company for many years. Irving Crosby recently returned from a professional trip to South America. The architectural profession predominated the meeting with some present who practice their profession, and others who just floundered through Course IV.

Stan Dunning made a report on the progress of plans for the reunion. Fifty have responded to the appeal for \$10, which gives us a nice working kitty. Our prognosis is that it is going to be a grand affair in every way. The formal business of the meeting consisted of three motions, all of which were passed unanimously. The most important was the following resolution: "On behalf of the Class of 1917, its successors and assigns he it hereby resolved, voted and affirmed for the propagation and other emoluments

and considerations to wit; therefor and to the contrary notwithstanding, be it voted that the President, Henry E. Strout, and the Chairman of the Reunion Committee Stanley C. Dunning and the Treasurer of the Reunion Committee, Lucius T. Hill, or any of them individually or severally be, and they hereby are authorized and directed to receive and disburse such funds as may be placed in their hands from time to time for the eventual glorification of the Class or until this vote be rescinded. Any or all of these funds to be deposited in such bank or banks as the aforesaid may direct." Mr. Lobdell offered an amendment which was so incoherent that we could not decipher our shorthand notes, but it seemed, in effect, to cast doubt upon the integrity of Messrs. Strout, Dunning, and Hill.

The second motion resulted in the election of Lucius as class orator. The final motion was for adjournment at the most respectable hour of 9:30 P. M. In the interim, Ted Bernard put in a plug for the 50th reunion class gift. Lobby gave a most interesting talk on his work (?) as executive vice-president of the Alumni Association. It appears that the local club situated in Mexico City is one of his chief concerns. The official records of the Association would indicate that this club, which was revived by the former dean about three years ago, was doing a very creditable job in its own right, but Lobby feels that it needs a little wet-nursing at least once a year. The verb may be wrong but the adjective is right.

Rudy Beaver left at the end of October for a "business" trip to the west coast, returning through Canada selling Beaver knives to the Royal Mounted Police. Rudy saw Neal Tourtellotte at Seattle. Barnett Dodge is back from his Japan trip, during which he studied local engineering education methods as a member of a U. S. Army Commission.

Dick Fay has done a new translation of the Gettysburg Address — this time to Washington officialese of 1951. The following paragraph is a fair sample of the upward trend in the American language, à la Fay: "The courageous units, in being and annihilated, who were active in this area, have integrated it to the point where application of simple arithmetical operations to include our efforts would produce only negligible effects. The reaction of the general public to his colloquium will be nonessential and transitory, but the reaction to the impingement of the combat groups is invariant. It is for this group in being rather to be integrated with the incomplete activities for which the combat groups who were active in this area have so comprehensively effected the initial implementation."

Lin Noyes received, in October, the University of Minnesota's annual award for distinguished service in journalism. The awards committee cited the work Lin's newspapers (Mariette, Wis., *Eagle-Star* and Marshfield, Wis., *News-Herald*) had done in furthering community improvement through agricultural advancement, better roads and schools, and improved community health and local government. Lin has been making a wonderful personal comeback from his illness, and is

now able to be at his desk a couple of hours each day. His annual pilgrimage to Delray Beach, Florida, began in December.

We hear from Ras Senter that, although "June 1952 is a long way off, I am already beginning to talk up a trip for our 35th reunion and am looking forward to being there if I can possibly make it." Dutch du Pont adds that "my plans are to keep my record clean insofar as commitments are concerned and hope to be able to be present if I get the breaks." How are your own plans coming along? — RAYMOND STEVENS, *Secretary*, Arthur D. Little, Inc., 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, *Assistant Secretary*, 24 Federal Street, Boston 10, Mass.

• 1918 •

As has been noted here before, The Review is made up with deliberation, for which cause the aroma of Thanksgiving turkey and the hissing of kitchen pots accompanies the assembly of these notes which you will not see until the calendar changes to another year. So expect the delicious aromas and the suggestive sounds of our report to reflect what has been cooking in other men's lives. Last summer Albert C. Walker was awarded the Louis Edward Levy Medal of the Franklin Institute of Philadelphia, in recognition of his paper, "Growing Piezo-electric Crystals," which appeared in the December issue of the Franklin Institute's journal. Dr. Walker is associated with the Bell Telephone Laboratories in Murray Hill as a crystallographer. Items on his artificially-grown quartz crystals have been recorded here before.

William C. Foster has left the Economic Cooperation Administration to succeed Robert A. Lovett as deputy secretary of defense. For a quick review of his sizzling career, after being a flier in World War I, he went to work for Packard Motors in Flushing, Long Island, and after a time switched to the Public Service Corporation of New Jersey. He next went to the Pressed and Welded Steel Product Company, Inc., on Long Island and was its president when called into government service in 1946. At that time he was appointed Undersecretary of Commerce under W. Averell Harriman. Two years later, when Mr. Harriman was named the Administration's ambassador-at-large to Western Europe to oversee the first operations of the Marshall Plan, he took Foster along as general deputy in charge of Paris headquarters. Foster has been with the E.C.A. ever since. In June, 1949, he succeeded to the post of deputy administrator of the E.C.A. and last September, when Paul Hoffman left government service to head the Ford Foundation, Foster became administrator.

The following is quoted from the inside cover of *Houses Have Funny Bones* by Royal Barry Wills, and published by the Bond Wheelwright Company of New York: "This book is written and illustrated with irresistible humor. Over fifty drawings highlight the funny situations Mr. Wills describes in some three dozen stories and sketches. The publisher defies anyone to read of Stig's experiment with

Yogi exercises in 'Stig-matisms' (page 61) or of the frantic family trip, replete with children, dog and cat — the latter allergic to thunderstorms — in 'Off to the Mountains' (page 126) without laughing out loud. In fact, there are chuckles herein from beginning to end. Royal Barry Wills, of Boston, Massachusetts, is well known internationally for his house designs. With hundreds of them to his credit, from cottages to country places, he has still found time for other pursuits within the profession, notably as author and cartoonist. *Life* magazine has featured him and has described his five popular books on the house as No. 1 architectural best sellers. In this volume, he has finally set down and illustrated a variety of his experiences with clients and craftsmen, collected over many years in architecture. Armed only with a good memory, a refreshing sense of humor, and a rare gift at delineating a funny situation in a few deft lines, he has done a very good job indeed. Mr. Wills is that rare combination, a dreamer and a successful business man, and is a lifelong researcher among the ever-challenging problems of home design. He believes that, to understand them fully, you must build and develop properties yourself, taking the personal risk of experimental design before handing along to your clients whatever improved processes you have discovered. This he has done and is doing extensively. Mr. Wills is an alumnus of . . . Technology and a member of its Executive Committee. He has won many architectural prizes in competitions and has received a coveted award for excellent achievement from his fellow professionals in the Massachusetts State Association of Architects."

Albert R. Mumford, research engineer for Combustion Engineering-Superheater, Inc., received the Percy Nicholls Award on October 11 at the Fourteenth Annual Joint Fuels Conference sponsored by the fuels division of the American Society of Mechanical Engineers and the coal division of the American Institute of Mining and Metallurgical Engineers. A. W. Thorson, supervising engineer of United Engineers and Constructors, Inc., made the presentation of the award, which was established in 1942 to recognize "notable scientific or industrial achievement in the field of solid fuels." Mumford spent four years as assistant fuels engineer with the U.S. Bureau of Mines, followed by over 15 years as research and design engineer for the New York Steam Corporation. From 1938 to 1942 he served as assistant director of research with the Consolidated Edison Company of New York, and then joined the Research Department of Combustion Engineering. The citation for the Percy Nicholls award recognized Mumford's contribution to important advances in the utilization of fuels through his research work on the combustion of coal, heat transfer, and circulation in steam generators. He has directed the work of the A.S.M.E. Special Research Committee on Furnace Performance Factors, the reports of which form an important contribution to engineering literature on heat absorption by boiler furnaces. Mumford has long been active in committee work of the American Society of Mechanical

Engineers, the National District Heating Association, the American Society of Heating and Ventilating Engineers, and the American Society for Testing Materials. He served as vice-president of A.S.M.E. from 1946 to 1950 and over the years has contributed many valuable articles to technical publications in the steam power field.

Rumor has it that Vannevar Bush¹⁶ and Alexander Magoun have entered into some kind of partnership, so that, in addition to the momentous responsibilities Dr. Bush bears as president of the Carnegie Institution in Washington, director of American Telephone and Telegraph Company, General Mills, Merck and Company, and so on, and the more modest responsibilities Magoun carries as president of an industrial consulting enterprise, the two of them are going to raise turkeys in New Hampshire. Let your frolic fancy play. They may produce a new Dagmar breed, feed the toms sex hormones, or dose the hens with Vitamin E. In any case, there's cause for Thanksgiving, any way you want to interpret it. —GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Roawayton, Conn.

• 1919 •

Our classmate, L. A. Gillett, writes that M.I.T. interests him more than usual because next June his son will receive his Master's Degree from Course XV at the Institute. He graduated in 1950 from Virginia Polytechnic Institute in chemical engineering, with honors, and is getting an extremely valuable course in higher education in Cambridge. As far as L.A. is concerned, he is still at the old wheel. The present rise in foreign coal shipments has his plant operating to almost more than 100 per cent capacity.

Recently had a note from Tom Goodwin saying that he was still swinging away at the same "old spot." He sends his very best regards to all. Nothing has changed on the Newton front except increased work, writes our classmate, Dr. R. S. Hunt. He adds: "Work increases, help decreases. It is about the same as though we were in a war instead of taking part in a 'Police Action.'" Charles W. Hyde is now working as deputy comptroller at the Naval Ordnance Plant, York, Pa. He is still living in Ardmore where three of his daughters attend Haverford High School. His son is completing 14 years in the Marine Corps and is presently stationed at Quantico. He has three children — two boys and a girl — so, as Charles adds, "I am blessed with grandchildren at an early age."

Your Secretary saw Jack Fleckenstein for a few minutes at the American Petroleum Institute meetings in Chicago early in November. Also had lunch with Jack Meader recently. His older children are away at school.

A follow-up of the activities of our classmate, Dean K. Webster, Jr., in the campaign of the Greater Lawrence Council of Churches, appeared in the October 26th issue of the *Lawrence, Mass., Tribune*. As mentioned in the article, he has been connected with, and is now treasurer of the H. K. Webster Company, grain deal-

ers, since his graduation from M.I.T. He is also treasurer of the New England Products Corporation, Boston, a past president of the Boston Grain and Flour Exchange, a member of the Central Methodist Church, and chairman of the Board of Trustees of that parish.

Alex R. Wren is very busy putting together another of his valuable manuals, this one entitled "You Are the Boss." It is still in its editing stage but he hopes to get it finalized and on the market shortly. —EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 385 Madison Avenue, New York 17, N.Y.

• 1920 •

A very pleasant visit with Buz Burroughs who was in Boston attending a printing convention (Buz is sales manager for the Dexter Folder Company) brought forth a bit of information about the epic voyage of some of our classmates last summer in a 48-foot staysail schooner, *Western Wave*. Our classmates are too modest or too reticent to regale us with a detailed account of their adventures, so all I can tell you is that Ed Ryer accompanied by individuals of lesser classes, namely, Mish Bawden²¹ and Yard Chittick²², chartered this schooner and sailed it up the coast as far as Camden, Maine. There it was taken over by Buz and Dick Gee and they went up to Bar Harbor. What happened after that, I don't know and they haven't told. At any rate, I judge from the comments that it was an exceedingly successful vacation cruise and that Dick Gee proved himself the true-blue water skipper that he is. How about more details, some of you fellows?

We understand that our illustrious Corporation member, Pete Lavedan, has had further honors heaped upon him. He has recently been made chairman of the board of Liquid Carbonic Corporation. Colonel Walter W. Warner is commanding officer of the Rock Island Arsenal. Colonel Warner got a master's degree in Mechanical Engineering in 1920 after graduating from West Point. Ralph Booth received mention in *Business Week* magazine recently as one of a committee of experts to review the Defense Production Administration's Power Program. Ralph, as many of you know, is a partner in the big consulting engineering firm of Jackson and Moreland.

Henry R. Murphy, our own Bunt Murphy, has been doing a lot of public speaking in connection with his job as executive director of the Berkshire Industrial Farm at Canaan, N.Y. Bunt has been working with boys practically ever since he got out of M.I.T., after studying public health. He put in several years of welfare work with children in Asia Minor and India, served as executive secretary of the Connecticut Children's Aid Society; he was an official of the Child Welfare League of America; and, before his present post, was executive director of the Colored Orphan Asylum in New York City. Bunt has done a wonderful job and is highly thought of by all who are familiar with his present institution and former activities. —Fraser Moffat's new address is 1035 Park Avenue, New York City.

It is with sorrow that we must report

that two of our classmates have dropped from the ranks: William J. Fitzgerald of West Roxbury, Mass., who was a civil engineer ever since his term of service in World War I as a lieutenant in the Army Air Force; and Theron F. Harvey of Lanesville, Mass., who was a mechanical engineer and one of the owners of the S. R. Harvey Coal and Oil Company. Theron worked for the New Haven Railroad and the Boston and Maine, and later moved to Kearney, N.J., where he was with the Western Electric Company. He leaves his wife, Marion R. Woodbury Harvey, and three children. — HAROLD BUGBEE, Secretary, 7 Dartmouth Street, Winchester, Mass.

• 1921 •

To you in the New Year — health, happiness, and continued success. Whether or not you attended our reunion last June, these newly announced dates offer opportunities for 1921 groups to get together: January 26 in Los Angeles, when members of the Faculty, local industrialists, and Alumni will hold a regional conference; January 31 in Cambridge, the date for the mid-winter alumni meeting. Alumni Day is now scheduled to be held this year on Monday, June 9, and our annual class party will be held that afternoon at the Hotel Statler.

President Jim Killian's annual report reveals many interesting facts, among them the fact that Course IX, administered by Jack Rule, now includes a five-year program for training science and mathematics teachers for secondary schools and junior colleges, conducted jointly by M.I.T. and Harvard. Also, for the first time in Institute history, members of the Faculty have been appointed residents in the dormitories to act in advisory capacities in view of "their broad background and their demonstrated interest in working informally with students." Jack and his family have been chosen to live in the newly acquired Alfred E. Burton House, formerly the Riverside Apartments, renamed last summer for the late Dean Burton. Jack is also chairman of the Section of Graphics at the Institute. He and Mrs. Rule have three sons and a granddaughter, aged three. Charles A. Breed is treasurer of the C. A. Breed Company, West Newton, Mass., suppliers of automatic heating equipment. A member of Rotary, Charlie has a commercial pilot rating and calls flying his sport and recreation. He and Mrs. Breed have two daughters, Betsy Ann and Beverly. Maxwell K. Burckett is director of production for Morse International, a New York advertising agency. He is a former president of the M.I.T. Club of Northern New Jersey and is now secretary of the Civil Defense Council in his home town of Maplewood, N.J. Max and Ethel have two daughters: Phyllis, a graduate of Lasell Junior College, and Gail, who is in high school. An analyst with H. P. Hood and Sons, Boston, Laurence K. Burrell serves as a trustee of the public library of East Bridgewater, Mass., where he makes his home. The Burrells have four children and a year-and-a-half-old grandson.

Si Freese, partner in the consulting hydraulic and sanitary engineering firm of Freese and Nichols, Fort Worth, Texas,

has sent a detailed biography of Henry Hutchings, Jr., retired brigadier general, Corps of Engineers, one of the West Pointers who was graduated with us in Course I. Since retirement in 1949, he has engaged in general engineering practice, with offices in the Praetorian Building in Dallas. Born in Texas, the son of the late General Henry Hutchings, who was adjutant general of Texas, he was graduated from the Military Academy in 1917 and became a chief engineer of artillery in World War I, with the rank of major. After 1921, he had various assignments as professor of military science in colleges and as district engineer in both Louisiana and Kentucky. He was graduated from the Command and General Staff School at Fort Leavenworth and became commanding officer of the Eighth Engineer Squadron. Later he commanded the Amphibian Command and the Fourth Engineer Special Brigade at Camp Edwards, Mass. He served with the brigade in the Pacific theater in World War II. From 1947 to 1949, he was division engineer in charge of the Southwestern Division, including portions of Arkansas, Oklahoma, Texas, and New Mexico. He holds the Distinguished Service Medal, the Legion of Merit for outstanding services in planning and executing all far-shore operations at Lingayen, and the Silver Star for gallantry in action in the battle for Manila. His home is at 4520 Cedar Springs Avenue, Dallas, and he has one son who also lives in Dallas.

Paul L. Hanson has a new home address: 220 Washington Avenue North, Minneapolis 1, Minn. He handles commercial refrigeration for Kold-Draft Northwest, Inc., of Minneapolis. John J. Healy, Jr., assistant to the vice-president in charge of research, development, and patent activities of Monsanto Chemical Company, has moved to St. Louis, where he now lives at 1700 South Second Street. New addresses have also been received for William F. Atwood, Dr. O. Kenneth Bates, Philip H. Hatch, Arnold C. Rood, and Hugh D. Seaver. Jack Whipple, President of Whipple Associates, engineering and manufacturing firm of 20 Van Dam Street, New York City, reports that his son George, M.I.T.'51, Course II, has a year-old son, J. Van Horn Whipple, who is scheduled to take Course II with the M.I.T. Class of 1973. George will receive an engineering degree from Rutgers this year. George A. Chutter visited us on one of his recent trips to his Jersey City headquarters and borrowed Rufe Shaw's excellent color slides of the Pine Orchard reunion to make copies for the Course VI-A brethren. We dispatched a joint note to Dug Jackson, who had inquired for a list of names of those in the reunion photograph. We hope the list in last month's Review was adequate for all who have the picture. Ray St. Laurent has pointed out that we inadvertently omitted the name of Buzz Burroughs'20 from the list of those attending the reunion, although the November notes did carry the notation that he won one of the golf prizes. The team of Buzz and Larry Davis'22 have attended all of our five-year celebrations and the latchstring will continue to hang outside for them.

Herb DeStaebler, Vice-president of Lambert Pharmacal Company, St. Louis, reported that he had looked up his old pals, Channing N. Baker, Clayton C. Westland, and Arthur F. Rogers'22, on a recent trip east. Channing lives in Harwichport, Mass., and Herb says: "Hobey Baker has four children. One was graduated from Tufts, two from Antioch College and one is a junior in high school. There are four grandchildren. Hobey has some chickens and a bench for whittling — on the sunny side in winter and the shady side in summer — and wide enough for two. You bring your own knife. Harwichport is a wonderful place but anywhere would be wonderful with Hobey there." Herb reports that Clayton is manager of the commercial printing division of the McCall Corporation, New York City, and makes his home in Scarsdale, N.Y. His elder son was graduated from Lehigh, saw service in World War II, and is in McCall's purchasing department. The younger son is five years old. Arthur, who lives in Great Neck, N.Y., and has a son in service at Fort Bragg, N.C., has been with the construction engineering department of the Port of New York Authority for the last nine years, most recently at Idlewild Airport. Of his own family, Herb says that Herb, Jr., who was graduated from the Institute in Course VIII in 1950, is now in the M.I.T. Graduate School working for his doctor's degree in nuclear physics. The younger boy, Stephen, is a sophomore at Princeton.

Chick Kurth, our class representative on the Alumni Council, reports that his eldest son, Malcolm, M.I.T.'49, is in the aircraft ordnance department of General Electric, Schenectady; Don, who was graduated from Boston University in 1951, is in the purchasing and expediting department of Stone and Webster, Boston; Barbara will be graduated from the Boston University School of Nursing this month; Anita is married and has a son and a daughter. Edmund G. Farrand, our new Class Agent, has allegedly "retired" to his colonial plantation, Route No. 2, Leesburg, Ga. Actually, he has been in constant correspondence with our President, Ray St. Laurent, and with Chick Kane'24 of the Alumni Fund at the Institute, and you have received a letter from him concerning the start of the 11th year of the Fund last October. Ed took part of a rainy day early in November to write: "Here are the names of the loyal sons of M.I.T. whom I have had the honor of appointing to be regional chairmen for assisting in this year's program of contributions from our Class: A. Ilsley Bradley, Cleveland; Edward R. Chilcott, Los Angeles; Edwin F. Delany, Chestnut Hill, Mass.; Zambry P. Giddens, New York; Alexander D. Harvey, New York; Melvin R. Jenney, Melrose, Mass.; Richard P. Windisch, New York. Incidentally, let no good friend of mine have any misconception that I'm idly leading a rocking chair life—not with work clamoring to be done now, such as 140 acres of peanuts in stacks waiting to be put through the peanut picker, and the peanut hay through the hay baler, 300 acres of corn standing until I can have the corn picker run through it. I am just finishing planting 150 acres of oats for grazing

and later to combine and sell for seed oats; 100 acres to plant in wheat before November 15; 150 acres of pasture to plant in clover; and in between times to try to look after 500 cattle on several pastures with about 27 miles of pasture fencing. Yes, sir, anytime you drop in to see me, you'll find me in khaki trousers and shirt with plenty of that good red Georgia dust smeared all over." — CAROLE A. CLARKE, *Secretary*, International Standard Trading Corporation, 67 Broad Street, New York 4, N.Y.

• 1922 •

Crawford H. Greenewalt, President of Du Pont, was the principal speaker at the annual banquet of the Illinois State Chamber of Commerce, held on October 19. Greenewalt's speech related to the question of incentives under our present system, and he pointed out how the taxation of personal incomes was now so geared as to lessen the incentive of persons in industry. He said: "But I doubt that the pleasure of paying higher taxes is much of an incentive and unfortunately the increases after taxes have become less and less as the level of responsibility increases. We are seriously concerned that our promising young people may not consider the competitive race worth their while." Greenewalt saw no short-term remedy for the present taxation system, but said: "The solution is one for the long term and will depend on informing our people in a manner that is sound, objective and free of bias or political controversy."

Harold V. Rasmussen has been named executive engineer of the Worthington Pump and Machinery Company at Wells-ville, N.Y. During World War II, Rasmussen was consultant for National Defense Research at Columbia University and a representative of the Navy Industry Committee on Propulsion Turbines and the advisory committee of the International Electro-Technical Commission. — James H. Compton has been appointed supervisor of plant accounting for United Illuminating Company of New Haven. James W. Kinnear, Jr., who until recently was the president of Firth Sterling Steel and Carbide Corporation, has been appointed general superintendent of the Edgar Thomson Works of the U.S. Steel Corporation at Braddock, Pa., August P. Munning acted as grand marshal of the parade of 22 Holy Name Societies as they marched in East Orange, N.J., on October 14. Gus is president of the Holy Name Society at his church, Our Lady Help of Christians, in East Orange.

Congratulations to our class president, Clate Grover, who was married on October 6 to Mrs. Laury Farrand Hawkes. Mrs. Grover is the daughter of the late Mr. and Mrs. Dudley Farrand, is a member of the Newark Junior League, and a former president of the Newark Garden Club. Following a brief wedding trip, the couple returned to their new home at 392 Lawn Ridge Road, Orange, N.J.

Larry Davis is a vice-president of Socony-Vacuum Overseas Supply Company, which on November 1 opened its offices at 158 Linwood Plaza, Fort Lee, N.J. Earl H. Eacker, President of the Boston Con-

solidated Gas Company, was elected second vice-president of the American Gas Association at the 33d annual convention of the Association, held in St. Louis on October 15. The American Gas Association is the trade association of the gas industry which is said to be the sixth largest industry in the country.

The following members of the Class are at present active on the Alumni Council in various capacities: Harold E. Koch is a member-at-large on the National Nominating Committee; Bob Tonon is again our class representative on the Council. The following are representatives of local groups: Parke D. Appel, Urbana; C. Yardley Chittick, Oslo; Earl H. Eacker, Havana; Warren T. Ferguson, Atlanta; Oscar H. Horovitz, Harrisburg; Theodore T. Miller, Paris; Karl L. Wildes, Schenectady.

It is our sad duty to report the deaths of three classmates: John L. Ewart died early on June 5, 1951, at Minneapolis, Kansas; Mrs. Phyllis Krafft Newell died September 29, 1951; and Rudolph R. Spangenberg died in Australia during the summer. Your Secretary has no further information at the moment of these deaths.

New Addresses: Donald F. Bixler, Rural Delivery, Berwyn, Pa.; Joseph H. Flather, Apartment 14, 33 High Street, Orange, N.J.; Charles M. Welling, 156 Sanford Avenue, North Plainfield, N.J. — C. YARDLEY CHITTIK, *Secretary*, 41 Tremont Street, Boston 8, Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Elliott Street, Buffalo 3, N.Y.

• 1923 •

Clarence P. Thayer is president of the M.I.T. Club of South Florida. I had occasion to be in Miami in November at a committee meeting, and during my stay there he arranged a get-together of a number of the members of the South Florida Club. Thayer is an officer of the State Health Department. — Rear Admiral R. T. Cowdrey is the new commander at the New York Naval Shipyard at Brooklyn. He was formerly at the Office of Naval Material at the Navy Department in Washington.

In September, William Webster was named president of the Narragansett Electric Company of Providence, R. I. Prior to July, 1950, he had been serving as chairman of the research and development board of the U.S. Department of Defense. — Robert C. Sprague, President of the Sprague Electric Company of North Adams, Mass., a classmate of Webster's at the United States Naval Academy as well as at M.I.T., was elected president of the Associated Industries of Massachusetts in October.

Peter V. Martin, sales manager of the metallurgical department, engineering and construction division of Koppers Company, Inc., since 1947, has been made an assistant vice-president in the Freyn Engineering Department of that division. The appointment was announced in August. Kopper's Freyn Department, which has headquarters in Chicago, specializes in engineering and construction of blast furnaces, open-hearth furnaces, sintering plants, and other installations for the steel

industry. During the past two years, Martin has spent much time in India and other countries abroad. He will continue to have his headquarters in Pittsburgh.

Bernard Lewis, physical chemist with the U.S. Bureau of Mines, is on a one-year leave of absence to be director of powder and explosives research development, Ordnance Corps, Department of the Army. Dr. Lewis is widely known for research in combustion, flame, explosion of gases, explosives, and mine-safety developments. During the war, he helped develop a smokeless, noiseless, and flameless grenade fuse now in general use for hand and rifle grenades. He will continue to live at 5863 Marlborough Avenue, Pittsburgh.

On September 1, Harold A. Dambly was appointed engineer in charge of the testing division of the Philadelphia Electric Company. — HORATIO L. BOND, *Secretary*, National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, South Broadway, White Plains, N.Y.

• 1925 •

Once the 25th Reunion Report was in the mail, numerous comments were received indicating that Ed Kussmaul has certainly turned out a very fine job, and it is a pleasure to again give him credit for this report. Typical of comments received is a letter from Frank Klein, XIV, which I quote as follows: "You can't imagine how much I enjoyed receiving the 25th Reunion Report. . . . It was particularly interesting to read about what all my classmates are doing now. Super-modest Bill Asbury has posed himself as a chemical engineer, whereas the Standard Oil Development Company forced upon him the title of vice-president many years ago, and I am sure he is the world's leading expert on patents. Jack Rountree lives in Scarsdale, N.Y., and works in Newark, N.J. I live in Mt. Lakes, N.J., and work in New York. Since my commuting takes one and three-quarters hours each way, he should be willing to change jobs or houses with me for our mutual convenience."

"Art Merewether got married in 1937 and then studied hard for three years (or did his weather forecasting for the Air Force take all his time?). He then became the perfect father for four years, after which he apparently retired. Probably the Air Force will get him again soon, though, so that he will be able to repeat the cycle. My old friend, Henry Sachs, graduated as a chemist. Now he has become vice-president of a company listed as Ins. Does that stand for insurance? If so, it must be his master's degree which taught him the ways of the world. Maybe it is an insulin company, though, which is somewhat connected with chemistry. Married in '46, child 10 — a chemical wizard!

"While finding fault with everyone else, I almost forgot myself. I graduated as an electrochemical engineer, then joined the Air Force and spent my best years flying airplanes of all sorts, to all kinds of places, in every kind of weather (before Art Merewether had learned how to conduct long-range forecasts). Having retired from that life of luxury, I am now working my way up toward retiring for a second

time, so that I can spend the last half of my life attending reunions, advising young folks what colleges they should attend, and reading *Time* magazine which I had to discontinue 15 years ago because I got too busy to read."

A clipping from the *New York Daily Freight Record* should be of interest to members of the Class. It is quoted as follows: "The State University Maritime College at Fort Schuyler, New York, today announced that Vice Admiral Calvin Thornton Durgin, U.S.N., Ret., had assumed the Presidency of the College, succeeding Vice Admiral Herbert F. Leary, U.S.N., Ret., who officially relinquished his post as of 31 August 1951. Admiral Durgin comes to the Maritime College with a distinguished Navy Record. A graduate of the Naval Academy, he also holds a Master's degree in Aeronautical Engineering from . . . Technology. He commanded the aircraft carrier, *USS Ranger* during the invasion of French Morocco in 1942. Later, he commanded a task force of United States and British carriers during the invasion of southern France. In December 1944 the escort carrier force he commanded gave United States troops a helping hand in the invasion of Mindora, later lending them support at Luzon. In 1949 he was assigned to duty in the Navy Department as Deputy Chief of Naval Operations for Air, the top ranking aviation job in the Navy. He held this position until 1 March 1950 when he became Commander of the First Fleet."

Many of you probably remember taking a course in hydraulics under our classmate, Professor K. C. Reynolds, I. He has recently been elected chairman of the University Senate for the academic year 1951-1952 at the University of Southern California. This happens to be the highest elected office of their faculty. The Senate acts as liaison between faculty and administration and carries on its activities through many committees.

A letter from Hiram E. Beebe '10, Secretary of the M.I.T. Club of Southern California, passes on the information that Finley Laverty, I, has been elected president for 1951 of the Los Angeles section of the American Society of Civil Engineers. Mr. Beebe asks that I bring to your attention that all Alumni having California for their winter vacations should include January 26, 1952, which is the date of the second National M.I.T. Conference, "Frontiers of Science," to be held in Los Angeles. Visiting firemen are urged to notify Mr. Beebe so that they can be included in the executive luncheons held the first Wednesday of each month.

It was a real pleasure to have recently received from Geoffrey Roberts, VI, a most interesting letter. Geoff is now located in Kuala Lumpur, Malaya. His post office address is 292 and I am sure he would appreciate having a line from some of you: "I am living in a part of the world in which there are few Americans and no M.I.T. Alumni, as far as I know. Malaya was only a name to me when I came here two and a half years ago, though I always considered that I was reasonably well informed on geographical matters. I was astonished to learn that 80 per cent of the

country was still under jungle and that the town of Kuala Lumpur, of which I had never heard, had a population of 200,000. Kuala Lumpur is the capital of the Federation of Malaya. It stands at the confluence of the Gombak and Ampang Rivers, which join to form the Klang. The name means muddy river mouth. You get a good idea of the country flying up here from Singapore—miles and miles of the rounded crowns of jungle trees, and here and there a river winding its way to the sea, with many more loops and twists than the Menderez.

Another unforgettable experience is flying over the Kinta Valley, north of here. The floor of the valley is covered with hundreds of worked-out mine holes, now filled with water of every imaginable hue, from reds and browns, through yellow and copper, and sulphate blue to green.

"My wife thinks Kuala Lumpur is less eastern than Cairo, where she lived for five years before the war, and I am inclined to agree. The population of the towns here is mainly Chinese and they control the country economically. The Malays are village folk and fishermen. They, with British backing, control the country politically. There is also a big Indian population, mainly Tamils and Sikhs. The Tamils work on rubber estates; the Sikhs are jagas—that is, they are employed as watchmen. The most important item of a jaga's equipment is his bed. These beds are hauled out at night, cluttering up the sidewalks. On each reposes a jaga, guarding and watching the building that employs him. But the architecture of the towns in European. Even the mansions of the rich Chinese towky's differ from European architecture mainly in detail. Other mansions are the property of European firms, which generally house their employees in this part of the world. The rest of the population is crowded into chop houses and slums. Another thing that surprised me when I came here is that the Malays are Mohammedans. I did not realize that the star and crescent of Islam had progressed this far east. When boys do their evening prayers here, they face west instead of east, which is a bit confusing.

"I am continuing this 10 days later. A good deal has happened in the meanwhile. Last week end, I was a couple of hours behind the tragic ambush on the Gap Road, in which Sir Henry Gurney lost his life. I was going up to Fraser's Hill to fetch my wife back to Kuala Lumpur. This particular road figures prominently in Chapman's *The Jungle Is Neutral*. It crosses the divide into Pahang and is so tortuous that every inch of it provides a good ambush site. The Communists appear to be putting the heat on in Malaya at the moment. In spite of the enormous treasure being spent on troops, equipment, police, and resettlement, the country is less safe today than it was a few months ago for people who have to go out in the field. The problem of making the country safe is tremendously complex and difficult. So much of it is concerned with long-range projects like education, the standard of living generally, and social services. The immediate problem consists

of some 4,000 completely ruthless bandits, operating in hundreds of thousands of square miles of jungle. They are equipped with the latest automatic weapons developed by western civilization and they are getting ammunition and money from some place. Replacement of those killed by the security forces is simple, as there is a huge reservoir of depressed and badly educated people in the country, who probably figure that any change must improve their lot. At the moment, I can see no end to the costly and futile 'emergency' that has been imposed on Malaya for the past three years by a handful of Communist-trained agitators.

"I am employed here by Pacific Tin Consolidated Corporation, which is controlled by the Guggenheim interests. I came out as electrical engineer and was appointed assistant manager about a year ago. Pacific Tin is the only American mining company in Malaya. Together with two local subsidiary companies, it is operating four dredges—one in Selangor and three in Perak. Dredges and the men who operate them are quite a specialized field of study. I believe the idea was thought up in New Zealand, but it came to fruition in California. Since the early days, dredging has established itself in an enormous arc around the Pacific basin, from Alaska and California through Colombia, Bolivia, New Guinea (where the dredges were flown in before the war), Indonesia, Malaya and Siam. The tin-bearing ore in Malaya is part of a unique and enormous deposit stretching from South China through Siam, Burma, and Malaya to Indonesia. At present, virtually all the tin is obtained from alluvial deposits worked by dredges or Chinese gravel pump mines. These deposits are becoming exhausted in Malaya and, owing to the security position, little new prospecting is being undertaken. No doubt at some future date, underground mining will have to be used to maintain the output of tin."—F. LEROY FOSTER, Secretary, Room 5-105, M.I.T., Cambridge 39, Mass.

• 1926 •

As usual, we are again writing from our little rock cliff above the ocean at Pigeon Cove. A winter sea is something that most people seldom witness, even those living relatively near the ocean. The incentives that draw one to the coast in the summer tend to drive most of us inland during the winter months. "The surface waters now become the plaything of the winter gales. As the winds build up the giant storm waves and roar along their crests, lashing the water into foam and flying spray, it seems that life must forever have deserted this place." We have quoted from *The Sea Around Us* by Rachel Carlson which we believe you will find most interesting reading, even if you live far inland.

With such a setting, what better time to plunge into the pleasurable task of organizing our class biographies. As previously mentioned, these biographies will be numbered consecutively and no attempt will be given to alphabetical or any other kind of order. In this way, we will be able to index them alphabetically later

on and refer to them by number. Therefore, when you paste the biographies into your scrapbook, leave some space after each clipping, especially the short ones, so that we can come back later on and add to anyone's biography as new achievements are brought to our attention. In this way we should have a current, up-to-date, biographical record of '26 men.

No. 2 — MILEM, CHARLES R. — 819 South Main Avenue, Sidney, Ohio. The nickname in this case is Milem and, believe it or not, he is a farmer. Milem took Course II at the Institute but has been operating a farm for 15 or 20 years. His 25th was his first time back, and at breakfast one morning he explained to your puzzled Secretary how he happened to get into this non-engineering field. The farm was in the family and there came a time when someone had to run it or let it go to pieces, and Milem was elected. He told us that it is a general type of a farm, which means that he does not raise all corn, all wheat, or all potatoes but a variety of crops. Milem states that running a farm is just like running a business and that it depends upon the use of good horse sense. Since he has been farming successfully for a long period, we conclude that he was endowed with a suitable quantity of said horse sense. Milem has one daughter, but he neglected to tell us her name or age. We will save that for one of the postscripts mentioned above.

No. 3 — LAMBERT, BARRON P. — of Eccleston, Md., better known to all of us as Bean, is assistant vice-president of the Fidelity Trust Company in Baltimore. Bean has not given us any more than what we asked for, namely a thumbnail sketch. He has three boys, aged 19, 7, and 5, which sounds to us like a career in itself. Bean spent a year during the war as a civilian pilot for Air Transport Command and has been active as chairman of the Maryland Foundations Committee. Bean, of course, was active in the M.I.T. Development Program in the Baltimore area and came to Boston several times to attend meetings in connection with the program. Leave plenty of space here because we will get a lot more information to add to this sketchy biography as time goes on, but apparently we won't get it from Bean.

No. 4 — HOPE, E. S. — When Ed Hope attended our 25th reunion, he was professor of civil engineering at Howard University in Washington, D.C., but since then he has become professor of civil engineering at the American University in Beirut, Lebanon. Ed's career has been in the engineering field since graduation, first with the New York State Highway Department and then with Electric Bond and Share Company in Brazil. Ed went with Howard University in 1931 as superintendent of Buildings and Power, where he remained until 1944. During World War II, he spent three years in the C.E.C., U.S.N.R., in Hawaii. We congratulate Ed on his new appointment in Lebanon and are looking forward to some interesting communications that we can report in these notes.

No. 5 — KELLY, E. BIRD — reports that

he has no nickname, but with a middle name like his, do you think he needs one? Bird lives in Rye, N.Y., the address being Overhill and Fairway. That sounds as though his home were located right in the middle of a golf course and, so saying, we refrain to comment about the 19th hole. Bird has two daughters—one 19 years old at Vassar, the other 14 years old in high school—but he did not tell us whether either one has red hair. Bird's offices are at 40 East 40th Street in New York and his letterhead is from the Glascock Brothers Manufacturing Company of which he is eastern sales and export manager (this is the outfit with which Johnny Drum is connected as executive vice-president at Muncie, Ind.). They are manufacturers of beverage coolers and heating equipment. In addition, Bird is president of Airdraulics Engineering Company of New Canaan, Conn., vice-president of Duralite Company, Dover, Del., and vice-president of the National Management Engineering Corporation of New York. These activities date back to the early '40's, but from 1930 on Bird has always been in business for himself, first in the construction business and then in the mortgage business. Only in the first couple of years after graduation did Bird work for others, in which period he was a metallurgist for the Belfont Steel Company, Ironton, Ohio, and assistant cashier of a bank in Huntington, W. Va. With a record such as this, Bird has earned the unqualified title of entrepreneur, and believe it or not he did not take Course XV, but was a Course III man.

No. 6 — HOPKINS, GILES E. — Hoppie, who has remained a bachelor all of these years, is technical director of the Wool Bureau; his address is 180 Central Park South, New York City. Hoppie has written us a biographical sketch that needs no modification. Therefore, we give you his autobiography, right from the Hoppie's mouth: "Most of my time since 1926 has been spent in that confused area between science and cash. Have organized two research and development groups in the textile industry, which God knows needed them. Currently, I am riding herd on a number of research contracts sponsored principally by funds from the United Kingdom dominions, synchronizing them with similar research abroad and attempting to present the results with enough sugar coating to make them palatable to the industry for which they were undertaken. I am told that the club where I have been living for some eight years has eight floors of athletic facilities, but I am leaving that to rumor, while making the maximum use of the several restaurants and liquid refreshment dispensaries. From time to time I draw on my old Tech Show experience in conjunction with club productions, but there is a difference. Where, in the old days, you cracked the whip over the cast, we now attempt a production with professional hallmarks by using a mixture of those who are, with those who have more good intentions than available time. The results don't actually pay at the box office but they do swell the receipts on food and drink; and, let's face it, what club is not in the saloon business? Age has

left absolutely no inroads, but time has. They are putting the seats in the train so near together that I can read the paper of the man in front of me more easily than I can my own, stairs are longer and steeper, my friends are fatter and balder, and the younger generation is getting more polite. I find that I am getting more eclectic about my sailing. At least my invitations to dinghy racing and frothing seem to come when it is awkward to arrange my presence, but if the boat is large enough to make the squatting unnecessary and small enough to make it sporting, say smaller than the *Queen Elizabeth*, I'm good for a couple of short cruises a year. I've accumulated a lot of first-named friends and associates, experiences that include those I am pleased to remember and those I would be happy to forget, and damn little cash. I suppose that I could have saved a whale of a lot of space by saying simply that the past 25 years have been typical of the second quarter century of those who have been neither especially blessed nor especially cursed."

Having made a start on our '26 sketchbook, we hope that those of you who have not sent us your 25-year history will do so. Whenever possible, your Secretary plans to visit with you in order to obtain a personal touch for the biographies, but it's going to be impossible to make a large number of such contacts. — GEORGE WARREN SMITH, General Secretary, E. I. du Pont de Nemours and Company, Inc., Room 1420, 140 Federal Street, Boston, Mass.

• 1930 •

Eleven members of the Class participated in the Alumni Day activities last June. Our Jack Latham, Vice-president of the Alumni Association, was chairman of the Alumni Day Committee. Other classmates in attendance were Charlie Abbott, Joe Harrington, George Kaplan, Bob McCarron, Bob Phelan, Frank Nettleton, John Rich, Hermon Scott, Willard Selden, and your Secretary.

It is with deep regret that we announce the passing of Willard L. Ulcher in April and of Charles L. Richardson in October. Willie, as we used to call him at the Institute, was chief engineer and naval architect at the Livingston Shipyard, in Orange, Texas. Richardson had been an air line engineer for United Aircraft in Hartford for the last 10 years. Our sincere sympathies are extended to their immediate families.

In September Bill Wheildon was married to Elda C. Johanson of Worcester, Mass., where he is experimental engineer for the Norton Company. The following month Joe Westell took as his bride Mary E. Walker of Fall River, Mass. Joe is in Providence as highway engineer for the U.S. Public Roads Administration. Architects have provided the next five news items. Reverend Dom Hilary Martin, O.S.B., is head of the department of religion at Portsmouth Priory School in Rhode Island. Mrs. Margaret Van Pelt Vilas has been elected a corporate member by the Connecticut Chapter of the American Institute of Architects. Her home is in New Haven. In the forefront as an exponent of modern architecture in home and building design is Elroy Web-

ber of New York, formerly of Springfield, Mass. George Nakashima of New Hope, Pa., exhibited furniture made in his home workshop at the Philadelphia Art Alliance in October. Ferdinand Rousseau, professor of fine arts at Boston College, is now serving as a member of the Cambridge planning board.

Other classmates in the news recently were Harold Anderson, for his appointment to the faculty of the Rhode Island School of Design as an instructor in textile manufacturing; B. C. D'Antoni, for his appointment as vice-president of Standard Fruit and Steamship Company, in charge of engineering; Bill Dickerman, for his arrival in London to serve as sales engineer for Lummus; Manuel Escandon, for his activity as head of the Mexican Institute of Technical Research; and Hermon Scott, for receiving another technical award, this time the John H. Potts Memorial Award of the Audio Engineering Society.

Letters containing newsworthy items from classmates will be most welcome if addressed to the undersigned and, we must confess, underworked members of the class secretariat. — PARKER H. STARRATT, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass. *Assistant Secretaries*: ROBERT M. NELSON, 2446 Iroquois Road, Wilmette, Ill.; ROBERT A. POISSON, 150 East 73d Street, New York 21, N.Y.

• 1931 •

The mail is starting to arrive and Course XVII takes the honor. Les Reed, who is assistant treasurer of George H. Reed and Company, Greenfield, Mass., writes that he and Enio Persson were sitting in the Reed office last July, discussing the whereabouts of the Course XVII men, when the telephone rang. It proved to be Irving Finberg who was passing through Greenfield on his way to Leavenworth to spend a year at Officers' Training School. Irving is still in the service and had the rank of colonel during World War II. He reported meeting John Minami, XVII, last April in Tokyo. Enio is still with Central Engineering, Washington, D.C., and makes his home at Silver Springs, Md. Les also reported meeting John Swanton, Jr., his wife, and infant daughter at a Greenfield hotel. The Reeds and the Swantons swapped stories. John is with Arthur D. Little Company and does considerable traveling, so one is apt to see him most anywhere. I hope to meet him in Maine one of these days.

Howard Richardson sent a short note and he expects to get to Boston in the near future at which time plans for the next reunion should start to roll. Howard is vice-president of Sylvania Products, with headquarters in New York. Lou Evans, otherwise known as "Mr. Crew," was in town last week, but we were unable to make connections. If you are in the vicinity of Cambridge please stop in. — AUGUST L. HESSELSCHWERDT, Jr., *Secretary*, Room 3-240, M.I.T., Cambridge 39, Mass.

• 1939 •

Manning Morrill of Dewey and Almy Chemical Company has been named plant manager of the new unit going up in Cedar Rapids, Iowa. Manning also re-

ported that his family "now consists of three girls and a boy." Congratulations are in order on both accounts. Wiley Corl will be interested, but not outdone, by the report on children. Wiley became father of No. 4 last spring, and likewise has three girls and a boy. Class members who are planning to submit birth reports at the 15th reunion in '54 are reminded that these men are the known leaders to date.

Dave Morgan, III, has been putting in a lot of international mileage following his mining career. Last summer he played a part in the development of lignite deposits in Greece, where lignite will be used in five steam electric power plants now under construction. Dave says that Athens is having its economic problems and was suffering a water shortage wherein water was available only three times a week, 6:00 A. M. to 9:00 A. M. This may indicate some of the Greek discomfort, but it is strangely reminiscent of New York City, 1950.

George Beesley, Vice-president of Whittemore-Wright Company, previously mentioned in this column in connection with his work with tanning oils, textile oils, and emulsifiers, is a member of the Pratt Institute Advisory Committee, School of Tanning and Leather Technology, where he is also guest lecturer. Fred Grant, as our new Class Agent, sent out a nice letter last October, and outlined the high lights of the successful Development Fund Campaign. Fred reminded us that the Alumni Fund was reactivated in October, 1951. His keen sense of proportion peeked out in his letter when he stated: "I realize that you are still engaged in discharging a commitment made to the Campaign. For this reason I am not asking that you give to this year's Fund in addition." While it is true that many of us are "discharging a commitment," it is possible that some '39ers are waiting to be asked to contribute. Not long ago, one of the secretariat met up with an Alumnus who intimated that he would be glad to donate but he was not asked. It developed that he was a rural dweller of means, but so far off the beaten path that canvassers would not find his home. We would like to invite those who read this column and who are not on the Campaign band wagon for the above reason, to come forth and join over 250 of us who are "discharging a commitment" and are glad to be doing it.

Mike Herasimchuk sends word that the 1951 National Amateur Golf Championship was held in Bethlehem, Pa., and in the course of his hospitality committee duties, he learned that one M.I.T. grad, Rudy Ozol'36, was among the 200 qualifiers. You may remember Rudy as one of our freshman R.O.T.C. instructors back in the days when student officers wore boots and spurs. Rudy qualified out of Union, N.J., and was eliminated in the second round by Dick Evans of Cleveland, Ohio. Listed as authors of papers at fall conventions were: Lou Castleman, at the American Society for Metals World Congress (his paper dealt with transformation of high-chromium steels); and Mike Herasimchuk at the Iron and Steel Engineers Convention in Chicago (his paper dealt with failure research on steel mill equipment). — Throughout the country manu-

facturers are exploiting cold extrusion of metals, and in Caldwell, N.J., Curtiss-Wright is working on the revolutionary process of cold extruding a complete aluminum propeller blade. It has come to our attention that Ben DeSimone has played a big part in this development.

A story released by the Navy Department brings to light the Navy career of Commander B. T. Macomber, who left M.I.T. in June, 1938, and became a naval aviation cadet. Bruce has an enviable record that includes 2,500 flying hours, 250 carrier landings, 2 Navy crosses, 2 air medals, Pacific theater ribbons, and the unmatched rating as "the most respected skipper of any squadron in the fleet." His present assignment is skipper of Fighter Squadron Twelve, attached to the U.S.S. *Coral Sea*. On shore, Commander Macomber and his wife are raising three children (g7, b6, g2) at Jacksonville, Fla.

The *Official Gazette* of the Patent Office announced that Richard Donohoe, now of Westmoreland Hills, Md., has applied for a patent on an automatic shoe-shining machine. Dick's machine can turn out 200 men's shines an hour, if necessary, and is designed to be installed in railroad stations, airports, and bus terminals. The mention of airports brings to mind the aviation career of George Moore, now heading up passenger service in the southwest for a well-known air line. George has been in passenger service for at least five years and doing well, but we shall always remember him as the first class member who had courage to grow a beard in undergraduate days. Bill Cutten reports that he is project engineer with James Lees Company, carpet manufacturers in Bridgeport, Pa. Our Class now has at least two members in the carpet business; the other is Bob Saunders, last known to be working on quality control at Mohawk Rug.

During the 1950-1951 volume of class notes, this column has carried notes on about 35 different members. This reflects the tough job the Secretary's staff has of getting sufficient copy on a representative number of class members. So far this year, over 30 members have been reported on, reflecting the increase in correspondence with the Secretary. However, the list of contributors includes a lot of faithful repeaters who have been coming through and "saving" the column. Many members still remain on the "absentee list" and have not been heard from in a long time. In attempting to bring news to the Class and to bring out the absentees, we shall try a new stunt. Below is a list of 15 names of classmates, chosen at random, who have not been heard from in a long time. We should like to have some word from them by February 15, so that we can report to the Class in the April issue. If this stunt brings results, we shall pick more names of old friends from whom we would like a message. The first group includes: Doc Wingard, from whom we'd like to have a presidential greeting, Chuck Ryder, Bob Plunkett, Paul Schneider, Dave Hammell, A. Lawrie Fabens, Phil Epifano, John Diver'40, Jack Bittel'40, Hal Muckley, Nick Ferreira, Clint Hilliker, Stu Arnold, Hans Bebie, Wee K. Yee. — STUART PAIGE, *General Secretary*,

701 Mill Plain Road, Fairfield, Conn. Assistant Secretaries: GEORGE BEESLEY, Whittemore-Wright Company, 62 Alford Street, Charlestown 29, Mass.; MICHAEL V. HERASIMCHUK, Post Office Box 495, Bethlehem, Pa.

• 1940 •

Lieutenant Commander Philip Clark Morgan, Jr., U.S.N., and Lieutenant Louiseannette Platt, U.S.N., were married in the chapel at the Boston Naval Shipyard last September. Both Phil and Louiseannette are stationed at the shipyard. Joe Cowhey, who received his master of science degree with us and who subsequently received his bachelor of laws degree from Duke University, has recently opened a law office in New London, Conn. Ed Chin-Park was recently in the limelight as the designer of the new \$1,000,000 community center of the Chinese Merchants' Association at 20 Hudson Street in Boston. During World War II, Ed was chief architect of the Aeromedical Research Center at Wright Air Force Base and a city planner of that nerve center of the U.S. Air Force.

This has been a short column to start the '52 Review. With your help I'll try to make the succeeding columns longer and more full of news. — ALVIN GUTTAG, General Secretary, 7114 Marion Lane, Bethesda 14, Md. MARSHALL D. MCCUEN, Assistant Secretary, Oldsmobile Division, General Motors Corporation, Lansing 21, Mich.

• 1943 •

As I look forward now, it seems fitting to bid you all a Happy New Year and to hope that you will have enjoyed a very Merry Christmas. I have also a resolution to urge that you adopt. Yep, you guessed it: It's the same old one — namely, resolve to write just one newsy letter to the class secretary in 1952.

Now for the news at hand; and let's start with weddings, of which there are three to chronicle. The first occurred on August 11, at St. Andrews Church in Bournemouth, England, when Stanley C. Paterson and the former Faith ("Paddy") Silvester were married. After graduation from M.I.T., the groom qualified for a bachelor of law degree from Northeastern University. His bride is an amateur figure skater of some promise, having won the 1951 Senior Free Skating Competition in Bournemouth. The former Lois Sekora and Raymond A. Charles were married on October 6, in Grace Episcopal Church in Newark, N.J. This couple spent their honeymoon in New England, and are now living in Detroit. Also, in October, the wedding of Gloria E. Hughes and James D. Ingham was celebrated at the Church of the Immaculate Conception in Portsmouth, N.H. This couple traveled into Canada during their wedding trip and have settled upon their return in Portsmouth. Jim is a consulting engineer, based in Shrewsbury, Mass.

You will be interested to read about the following engagements, too. From Winnetka, Ill., Mr. and Mrs. Sylvanus George Lee announce the engagement of their daughter, Mary, to Laurence Joel Winik.

The future bride, who is a member of the United Nations Secretariat, attended Carleton College, Northfield, Minn., and graduated from Mills College, Oakland, Calif., followed by graduate work in Europe. A November wedding was planned for Joan Kingsbury and Herbert Greene-wald, Jr. Herb's bride lives in Taunton, Mass., and she is a Boston University graduate. Diane Jane Kauffman's parents have announced her engagement to Daniel B. Miller. Diane, whose home is in Providence, R.I., is now a senior at New York University. Scheduled for December 9, 1951, was the wedding of Jacqueline Elaine Goldman and Richard M. Feingold. Dick's fiancée graduated from Smith College in 1947 and then qualified for a master's degree from the Boston University School of Social Work. Dick has completed his studies at Boston University School of Law and is a member of the Connecticut Bar.

It is announced that Coast Guard Commander Charles E. Columbus will be captain aboard the C.G.C. *Mackinac*, an ocean-stationed vessel which will observe weather conditions and stand by for air and sea rescue work in the Atlantic.

A "biography" of Sidney Kibrick, M.D., and his wife has come to my attention. Here are the high lights. Dr. Kibrick earned his bachelor's degree at Harvard, after which he came to Technology and received a doctorate in bacteriology in 1943. He then was granted a research fellowship at Boston University School of Medicine. After qualifying for his medical degree in 1946, he interned at the Massachusetts Memorial Hospital for a couple of years, then entered the Army, and spent some time at the Walter Reed and at Murphy General hospitals, together with a year in Korea. Following release from the Army, he studied leukemia at Boston Children's Hospital on a research fellowship from the National Cancer Institute. Just recently, he entered the medical service of Children's Hospital in Boston, where he will develop further his field, pediatrics. His wife, the former Anne Karlen, whom he married in 1948, has had about as busy a career in the nursing field as he has had in the medical field! A graduate of Worcester Hahnemann Hospital, she has pursued graduate studies at the Sloan Maternity Hospital in the New York Medical Center, then on to Boston University for a degree in education, followed by an assignment with the American Red Cross. There followed a period at the Charles V. Chapin Hospital in Providence; thence, to Teachers' College at Columbia for a master's degree, and then for a year as educational director at Cushing Veterans Hospital, and, for the last two years, as assistant professor at Simmons College. She is also, working toward a doctorate in education from Harvard. Two busy people these!

And now to the mail bag. Hit the jack pot with two letters this month! From Sherman Sackheim we learn that he "operated a very interesting mail-order business until last October, when Bang! Uncle Sam got interested in me again. I had stayed in the active reserve, and was suddenly called for a final physical, and then told to go home and wait! So I disposed

of my business and got set to go back into the Army. Well, I waited, as did many of the other men in the same predicament, and finally got word that it was a false alarm, and that they did not need us yet. Meanwhile, however, I am with my Dad's advertising agency, helping to organize mail-order ventures for some of his clients. It is very interesting, but what the future holds, no one knows. I am now married to the former Pauline Eames of Reading, Mass. We are, of course, living in the vicinity of New York, but manage to get up to Boston frequently to see our old friends."

The second letter is from Air Force First Lieutenant S. A. Scharff. Sam writes, in part: "Served during the war in the Second Operations Analysis Section with the Fifth Air Force and later with Headquarters, Far East Air Forces. Very interesting scenery — Melbourne to Tokyo — with many way stations included and no excitement outside of an occasional raid and a collision between a P-47 and a sugar mill we were using for shelter on Mindoro. The section did interesting and important work on bombing accuracy and force requirements for missions and air campaigns, as well as in a number of other fields. Then back to M.I.T. briefly and thence to work for the M. W. Kellogg Company on automatic control systems and computers. Spent more than four years there working on Air Force control systems and on industrial control problems, attaining the lofty status of project engineer. In the midst of arranging to take some time off before starting to work with another organization (Kellogg is dropping computer work to concentrate on aircraft engines), I received a call from the Air Force. They were not quite the people I had expected to join up with, but their arguments were persuasive. So now the Class has a representative in the Air Research and Development Command at Rome Air Development Center. Visitors welcomed. This is an interesting assignment, involving planning for R.A.D.C.'s programs, including the one we worked on at Kellogg! Alan Milman, as perhaps you know, was called up in the A.A.A. last winter and was with a gun battalion at Fort Dix the last I heard. I saw the James McDonoughs in Boston twice last winter. Jim was working on a machine tool control at the Servomechanisms Laboratory, M.I.T. About the same time, Paul Travers, 2-44, was digging in at Ultrasonics, Inc., where a new division for computer control problems was starting up. And I met Jim Reswick at M.I.T., where he was doing a research project on hydraulic valves."

Eduardo Baranano da Costa has recently moved from Montevideo, Uruguay, to Santurce, Puerto Rico, and John Barney is now at 304 Gramercy Avenue, Minneapolis, Minn. Ed Bullerjahn has moved eastward, too — from Milwaukee to Wacabue, N.Y. Robert W. Caldwell, Jr., who used to live in La Jolla, Calif., is now to be found in Gulfport, Fla. Earl J. Connelley, Jr., is in Korea, and Philip Dalrymple, Jr., is now in Baltimore. Captain Walter Guild, Jr., until recently reached through an A.P.O. address, is now in Albuquerque, N.M. Lieutenant Orvis B. Hartman is at

Oxnard, Calif. Michael Witunski is in the Pentagon with the Air Engineering Development Division. — CLINTON C. KEMP, Secretary, 29 Verlynn Avenue, Hamilton, Ohio.

• 2-44 •

Your Secretary once again is going to endeavor to put some news into the class notes. It has been extremely difficult to keep up with the Class since you neglect to supply me with information. The registration for last Alumni Day, June 11, 1951, included Trinela Bejarano, Warren Delano, Thomas Dolan, Joseph Donahue, Earle Hodgdon, Warren Howard, Albert Madwed, Edgar Moor, Wendell Peacock, Robert Peck, Egidio Picardi, Alden West, and Philip Whitaker. The Class is now the possessor of an author in the name of Bill Ritchie. He has written a textbook that concerns itself primarily with the principles and systems of plant control. *Production and Inventory Control* is the name, and it is published by the Ronald Press Company, New York. Bill is now assistant professor of industrial management, Department of Business and Engineering Administration, M.I.T. Bruce Kingsbury has left the science department of Milton Academy to enter administrative work at M.I.T. Norman Beecher and his wife Nancy have been at Robert College, Istanbul, teaching. Nancy teaches the elementary school and Norman teaches chemistry at the college. The school is located on the European shore of the Bosphorus, atop a 300-foot hill, commanding one of the most beautiful views of any campus in the world. Life is pleasant for the Beechers, whose apartment overlooks the Fifteenth-Century castle of Mohammed, 2d.

Paul Robinson was working on guided missiles in an airplane plant and, as of last year, he was guiding bus loads of assorted tourists daily from the Hotel Biltmore in N.Y., to the United Nations at Lake Success and Flushing Meadows. Paul quit engineering and turned to political science at Columbia with the intention of teaching, for the same reason that he abandoned guided missiles. He says there is a lot of knowledge about how to solve the weapons problem but no way to prevent the need for their use. Gordon MacDowell, a former member of the Nautical Association, used his sailing instruction, received at M.I.T., to good advantage this summer when he sailed a "Pinkey" with a friend through the Cape Cod Canal to Cantamuet. They started from Halifax, Nova Scotia, and called at ports each night. At Foster's Point, Maine, they picked up Maynard Lee, an M.I.T. Naval Architect, and continued their trip which lasted from July 14 to August 14. They encountered some excitement when they rode a New England gale across the Bay of Fundy. Mac is on the faculty at the Thayer Academy, Braintree, Mass. — Harold Miller is now a member of the Army Air Force serving a tour of duty in Europe. He has recently been promoted to captain. Ken Nelson has left the new car business and is with the Tech Products, Inc., on Staten Island, N.Y. Bev Tucker is now with the Texas Instrument, Inc. He has been promoted to the position of pro-

duction scheduler. His company is an outgrowth of Geophysical Service, Inc. Weddings and engagements: Halbert Germer married Elizabeth Morton of Watertown, Mass. He is now employed by the Knolls Atomic Power Laboratory of the General Electric Company. Bob Sullivan married Jean Begley of Arlington, Mass. He is an aeronautical engineer for Sikorsky Helicopters in Bridgeport, Conn. William McConnell and Nancy Price married in Hartford, Conn. Bill is an electrical engineer with the Cardwell Manufacturing Company in Plainville, Mass. Jim Gallivan married Ann Condon of Milton, Mass. William Murray married Elsie Peck of New York. The bridegroom is working for a Ph.D. at Brown University. Eunice Dibley married Charles Burns in Caledonia, Minn. Bill Abbott and Barbara Kallkvist married at Hartford, Conn. Bev Tucker and Bob Faurot were ushers. Bill is with the United Yarn Company of Brockton, Mass. Carl Lindemann has also married. Marguerite Williams of Beverly Hills, Calif., was the bride. Laurence Dowd is married and living in Chicago. He is employed by the Transparent Package Company as a chemical engineer. Robert Fisher is now married to Grace Rose of Ft. Worth, Texas. John Breymann married Ferol Stark of Milwaukee, Wis. Bob Oppenlander and his wife, Jellie Major, are living in Attleboro, Mass. Bob is employed by the Metals and Controls Corporation. Henry Maier and Cynthia Locke were united in marriage last year. They are living in Santa Monica, Calif., where he is with the Douglas Aircraft Factory. Alan Michaels married Janet Glotzer of Hartford, Conn. Alan is now a lieutenant(j.g.) in the Navy. Miguel Negrin recently married Glenna Lewis of New York City. He is with the Westinghouse Electric International Company. Ralph Seferian is engaged to Esther Boghossian. Tom Carmody is to be married to Carolyn Galvin of New York. Tom is a chemical engineer with the Union Carbide and Carbon Corporation. Yours truly is now the manufacturing engineer for Seismic Equipment at the Texas Instruments Corporation of Dallas. — WILLIAM B. SCOTT, General Secretary, 4412 Middleton Road, Dallas, Texas. MALCOLM KISPERT, Assistant Secretary, Presidents Office, M.I.T., Cambridge 39, Mass.

• 1947 •

At this writing, those business-reply envelopes are just beginning to pour into the office with your reactions to our first official reunion announcement; and it certainly is a pleasure to hear from so many of you in such a short time. Jack Lehmann was one of the first to reply, and he writes: "I will be only too glad to help out as far as promotion of our reunion goes. I certainly am anxious to see all the boys again, and wouldn't miss it for anything. Enclosed is my check." In sending his \$5 registration deposit, Don DeWitt writes: "I've been married since '48, and have a year-old daughter, Diane. I believe you met my wife Marian while we were still at school. I'm in the machine tool and machine supply business in New York, and things have been pretty busy of late. We just bought this home in Great Neck and moved here

in August, and with the basement flooding, the washing machine breaking down, and so on, my technical training has come in very handy. (That is, I know just how to dial the phone, and call the plumber, electrician, and so on.) The only one of the boys I have seen lately is George Katz. He's a J.G. in the Navy at Newport."

Pete Portmann dropped by the office late in October with his whole family. He and Bobbye were up in Boston for a week end, and brought their four-year-old son along. We got on fine. Pete is one of the many who has volunteered to help out with the reunion in his city, Washington, and when he forwarded his registration deposit, he wrote: "Will do the best I can to round up any members of the Class for reunion." Bob Warner and Bob Horowitz are two others who have registered for the big wing ding.

At any rate, promise of the reunion has brought in quite a spate of letters. Vince McKusick, who is clerking in the Supreme Court, says: "Please accept my apologies for the delay in answering your letter. I have waited in the hope that I would know definitely whether or not it will be possible to be on hand for the get-together. The only certain thing is that it is now uncertain whether I will be able to come. It will all depend upon whether the Court finishes up its work to adjourn before early June." Ensign John Contegni writes a very newsy letter (the answer to a secretary's prayer): "I'm looking forward to the reunion with much enthusiasm. As I'm now on active duty with the United States Navy, you can readily understand that it is virtually impossible for me to state that I will be able to attend the reunion. At the present time I'm stationed at the New York Naval Shipyard serving as an engineering specialist with the Bureau of Ships. As far as I know I will be at the yard for approximately six months. After this period I expect reassignment. Entered the Navy last May and attended a four-month O.C.S. course at Newport, R.I. Never thought the government would finance a summer in Newport for me! Prior to my entry into the Navy, I was employed by the George A. Fuller Company as a construction manager, and had been with them since March, 1947. Was attached to the Washington, D.C., branch office during most of 1948 — that's when Chuck Bauer arrived in D.C. to put some new vim and vigor into the Bureau of Standards. By the way, Dick Kondolf is now married, is back on active duty with the Navy, and is also stationed at the New York Naval Shipyard. Jack Harvell is now a proud papa: eight-pound boy, John Thomas, Jr. Mama is the former Barbara Murphy of Cambridge. Ed Hylas took the fatal step back in May. He married Kay Higgins of Queens, N.Y. Frank Heger '48 and the Mrs. are now living in Ashtabula, Ohio. Frank is engaged on a construction project out there with Ford Bairn and Davis, industrial engineers."

Another of our classmates who has answered the call to the colors is Lieutenant Don Mains, who writes from the St. Louis Medical Depot: "As you can see by the return address on the envelope, and the higher taxes you're paying, I've been militarized, and not over-willingly. It seems

you are working up wonderful plans for the '47 reunion. I wish I could be of help in drumming up enthusiasm for the affair. As it is, though, it's not very likely that I'll even be able to be there; such are the whims of Uncle Sam." Hunter Bennett, who writes that he is practicing law with his father in Weston, W. Va., Tom Crow, Hy Fisher, who is a second-year medical student at the New York University-Bellevue Medical Center, Jack Hill, Jack Mohr, Tony Quesada, and Watt Webb are others who have indicated their desire to attend the reunion, although they can't say for sure as yet.

A letter from Hans Wittels to The Review states: "I am now married; my wife is the former Annalisa Akerström. At present I am employed by the Lockheed Aircraft Corporation in their engineering department. I moved to Burbank from New York in May. In New York City I had been with Gibbs and Cox Naval Architects for 26 months." A release from the Standard Oil Company of Indiana states that Judd Healy has been promoted to group leader at the company's Wood River, Ill., laboratory. Herbert Wieland, executive director of the Hartford redevelopment program, has been named city planner of Manchester, N. H., and Ahmad Ali Kheiralla has been appointed an instructor in mathematics at the University of Massachusetts. Ahmad received his M.S. at Stanford University, after which he took an appointment as an instructor at Santa Clara University until February, 1949, when he went to the University of Vienna.

Don Boynton has been given the post of supervisor of the pilot plant division of the Hercules Powder Company in Wilmington, Del. Chung Hua Wu has assumed a professorship at the Polytechnic Institute of Brooklyn, and will direct a research project on turbomachines in jet engines in the department of mechanical engineering, as well as lead the thermodynamics division. Martin Goldman has been admitted to the Massachusetts Bar, and George Brooks was ordained a minister in the Unitarian-Universalist Church last June. On a recent business trip to Philadelphia, I had dinner with Fred Ehrlich one evening. After taking his doctorate in Mechanical Engineering last June, Fred accepted a position with Westinghouse where he is engaged in gas turbine research. While in Philadelphia I also saw much of Fred Hollowell'48, Herb Kindler'48, Bob Loewy'48, and Bob Talambiras'49.

Fall engagements that we have word of are those of Ed Ritter and Priscilla Rich of Plymouth, Mass.; Bob Smyth and Adella Mary Carroll of Milton, Mass.; and Bill Graw and Kathryn C. Pflueger of Miami, Fla. Weddings to report are those of Bob Walp and Mary Frances McNamee of Altadena, Calif.; Bob Savage and Ann Elizabeth Orr of Short Hills, N.J.; Dave Blattner and Doretta Leigh Steinway (the piano Steinways) of Mountain Lakes, N.J.; Walt Pierce and Marianne Fisker of Kongen's Lyngby, Denmark (Walt is studying in Europe on a Fulbright Fellowship); and Donald Dean and Grace Anne Pumphrey of Wilmington, Del. — CLAUDE W. BRENNER, General Secretary, Room 33-316, M.I.T., Cambridge 39, Mass.

• 1948 •

Aren't you ashamed? Here you sit reading these class notes about all your old school chums and, we'll wager, haven't written your Secretaries any news about you for how many months? So stop now, yes right now, and pen a few lines to us before another day has passed. This appeal is based on the assumption that we still do have some few readers. If you do not see this, please write and tell us this also.

A letter was received this month from H. E. Beebe'10, Secretary of the M.I.T. Club of Southern California. He asks that we remind all Alumni having California in their winter vacations that on January 26, 1952, the Second National M.I.T. Conference, "Frontiers of Science," is to be held in Los Angeles. Visiting firemen are urged to notify Mr. Beebe so they can also be included in the executive luncheons held the first Wednesday of each month.

Your Secretary recently had a short visit with Ken Brock in Cleveland, where Ken is in charge of advertising for a good part of the Gabriel Company's output. From him it was learned that Carl Boll has taken over as operating head of his family's business and is doing fine; Bill Katz is with Ionics; and Jim Adelstein, the everlasting student, is still at Harvard Medical School.

Engagement announcements include those of Guilford Spencer, now studying for his doctorate at the University of Michigan, to Eleanor Penfield; Mark Connelly, a research engineer at M.I.T., to Helen Cooke; George Hossfeld to Mary Jo Van Hoesen; Lincoln Richardson, also doing research at Technology, to Katherine Lansdowne; Ray Ellis, doing chemical research work for Heminway and Bartlett Manufacturing Company in Watertown, to Gretchen Mathias; Joel Rossen, with a research corporation in Alexandria, Md., to Barbara Cohan; and Herbert Shuster to Rosanne Feldman.

Weddings in the news are those of Harry Kopp, employed by General Chemical in Claymont, Del., to Barbara Gage; Arthur Kuljian to Lucille Mardorian; Bob Dean, an Assistant Professor at M.I.T., to Edith Hayes; Lieutenant Joseph Stoutenburgh to Sarah Halsey; Helen Shoener, a co-ed, to Dr. Lawrence Shalit; Milton Slade, engaged in government-sponsored electrical engineering research at Technology, to Jean Hupper; Alexander Aldrich, now at Harvard Law School, to Elizabeth Hollins; and Louis Curdo, employed at General Electric's Syracuse plant, to Elinor Jane Wolfe.

One birth, too, has been brought to our attention: that of a son, Harold, Jr., to Mr. and Mrs. Harold Morgan on September 16 in Baltimore. Harold is employed as a dynamics engineer at the Glenn L. Martin Company in Middle River.

Dick Jones has received his master of arts degree from Harvard College; and Sergeant Joe Luceri is attending Officers Candidate School at Fort Sill, Oklahoma. Before entering the service over a year ago, Joe had been employed as an electrical engineer at the Pittsfield plant of General Electric. — WILLIAM R. ZIMMERMAN, General Secretary, in care of Kurt Salmon Associates, 3000 Albemarle

Street, Washington 8, D.C. RICHARD H. HARRIS, Assistant Secretary, Lovell Road, Holden, Mass.

• 1950 •

News is down to a minimum this month. Your reporter won't be liberated from the clutches of O.C.S. until December 15th, and seeing that his deadline for this issue falls before that happy date, he has been kept out of contact with most of his supplies of information.

William Enders and Mary Jean Humphrey were wed in Brookline on September 8. Bill is now working at Technology as research engineer. Mr. and Mrs. Stanley Martin have made their home in Buffalo, N.Y. She is the former Patricia Frisbe of Troy, Ohio. Lois Mae Hay and Franz Tyaack were married on October 6 at St. Paul's Methodist Church in Brooklyn, N.Y. After a wedding trip to the Virgin Islands and Puerto Rico, the couple will reside in Mansfield Gardens, Brooklyn. Clara Lorraine Younglove and David M. Uline were wed on September 1 in the Church of the Ascension, Rochester. After a trip through New England, the couple will settle down at Detroit, Mich.

Norman Champ, who is doing graduate work at the School of Business Administration at Harvard, and Anne Van Arden have announced their engagement. Eleanor Davis and Chester E. Claff, Jr., have announced their engagement. He is currently doing graduate work at Technology. Jane Bullen Train and John Robert Flynn made plans for a December (1951) wedding. Claireanne Powers and Eugene Robert Ganssle have announced their engagement. Avis Carter and Cadet Gregory G. Gebert have announced their engagement. He is at Lackland Air Base, Texas, where he will enter O.C.S. They are planning a spring wedding.

Upon close reading of the next news clipping, announcing the engagement of Phyllis Bader and William E. Krag, I see that I am a bit behind the times. The clipping says that the newly engaged couple have set their wedding date for October 21st. Best of luck to the now Mr. and Mrs. Krag. Rene M. Grinnell and Harold T. Wilson, a former Walker staff man, have announced their engagement. Walter W. Harvey has been appointed assistant professor of chemistry at St. Lawrence University, Canton, N.Y. He is married to the former Dorothy Barnes and they are proud parents of an eight-month-old boy. Gerald Peretsman is now employed as a food engineer by Dennison's foods of Oakland, Calif. Marvin E. Murphy, a Course VI boy, is now stationed in Casablanca. Private Reginald A. Krystniak was assigned to the Transportation Research and Development Station at Fort Eustis, Va.

The Navy Department announces the promotion of Lieutenant (j.g.) William Murphy to the temporary rank of lieutenant in the U.S. Naval Reserve. Lieutenant Murphy is presently serving aboard the destroyer *Smalley*. Second Lieutenant John H. Litchfield recently graduated from the Officers Food Service Supervisors Course at the Quartermasters School at Fort Lee, Va. He was called to active duty in May, 1951.

Good news from the fighting front. Corporal Joe King is returning home from Korea under the Army's rotation system. Joe has been in Korea since last January and has served as an operations clerk of the First Cavalry Division's Seventh Cavalry Regiment throughout three major campaigns of the war. For his service in Korea, he wears the Korean Service Medal, the Distinguished Unit Citation, and the Korean Presidential Unit Citation.

Two more of our officers in the Corps of Engineers have left for Europe this month. Jack DeWitt and Sterling Brisbin both were stationed at Belvoir, Va., for the summer and fall, but I noticed in the *Army Times* that they both were heading for service in Europe. John B. Malloy was recently added to the technical staff of the Whiting Research Laboratories of Standard Oil Company of Indiana.

A letter from Phil Byrne gives much news of the activities of Sir Stork. Hank and Peggy Boyles, who are now living at Newport, Del., became the parents of a baby girl on October 1. Phil was racking his small brain trying to remember the name of the new addition to the Boyles' household, but he was unsuccessful, so I guess we will have to wait until Hank writes and informs us. Bob and Peggy O'Neill entertained Sir Stork way back on the 8th of March. John Kevin and Bob and Peggy are now living at Kenmore, N.Y. As for Phil, he is still happily employed at Delco and he and Jean expect a special delivery package from Sir Stork late in January. Congratulations to all the new additions to the Class of 50's ever-growing family.

My crystal ball predicts a happier than usual New Year. I'm going back to Fort Belvoir in January for some more schooling. In case I missed any of the old gang during the Christmas season, I'll be seeing you at most any convenient cocktail lounge during the next three or four months while I'm at Belvoir. Sit down and write and tell your reporter the time and place, and we will swap stories over a couple of brews. Good-bye until next month. — JOHN T. WEAVER, *General Secretary*, 1772 East Tremont Avenue, Bronx 60, N.Y.

• 1951 •

Another new year has begun, and from all indications it looks as though it will be a banner year for the '51'ers. Last year at this time we were looking forward to the ending of the first term of our senior year at M.I.T. and thinking about what we would do after we left. As things turned

out, some of the boys (and gals) figured that it was time to go to work — and the opportunities for employment were good! Others decided to work toward higher degrees. And for some, Uncle Sam proved to be the employer. Here's hoping that all '51'ers keep up their excellent record wherever they may be.

Your Secretary took time out to wander over to Technology to watch the Field Day activities. Though the events of the day proved to be interesting, somehow it just didn't seem to hold the attraction it did when we were sophomores and were looking forward to crushing the '52 men. It either is age or else the alumni view is developing — possibly both. At any rate, I was pleased to see many familiar faces of some of the guys and gals who decided to travel a bit and refresh their memories, in addition to renewing old acquaintances. Fred Lehmann and Ralph Romano decided to discard their officer dignity (?) and don civies for the occasion. Marty Miller and Lou Marcus kept on their Air Force blue's, and from their comments, the Air Force is treating them quite well. Bob Gooch, as well as Jerry Hartstein, were also there. Among the civilians present, we found Karel den Tex. Karel is working with I.B.M. at Poughkeepsie, N.Y., and feels he is using his M.I.T. background to good advantage. Jimmy Nolan and Bob Cushman were also there; both of them are employed at D.I.C. at Technology. Jimmy informs me that Clark Abt is employed at the art of teaching English, which goes to prove the versatility of the Technology men. Mrs. Browder, the former Eva Tislowitz, was also present and enjoying the festivities with her husband. By the way, the sophomores won Field Day. And now let's take a look at what the mailbag holds.

Engagement notices head the list. Gordon Zucker became engaged in September to Phoebe Berman of Milwaukee, Wis. Gordon is now on active duty in the Ordnance Corps of the U.S. Army and is stationed in Aberdeen, Md. Bob Kingston became engaged to Ruth Ahara of Somerville. More news is available concerning the boys who said "I Do." The following marriages took place: Bill Callahan to Millicent Jarvis in October at Buzzards Bay, Mass.; Evan Evans to Adele Tontarski on September 15 at Watertown, N.Y. (Evan is connected with the engineering department of the California-Texas Oil Company, Ltd., New York); Frederic Grant to Katherine Van Wyck on October 27 at Ipswich, Mass. (Fred is doing research work at M.I.T.); Ray Haak, Jr., to Delores Jones in June at Marshfield Hills,

Mass. (Ray is now at Yale taking a three-year course in microbiology); Harry LaTowsky to Audrie Fornshell in September at Boston (Harry is working for the F. J. Stokes Machine Company as their Boston representative); and Carl Nogueira and Genevieve Zacharias were planning a December wedding. Also, Hal Siegel joined hands with Consuelo Merritt in September at Peterborough, N.H., while Les Slocum and Eileen Churchill tied the knot in September at Stamford, Conn.

Only a few items arrived to cover the service activities. Tom Kelly is in the midst of a four-months' indoctrination course for officers at the Naval Officers' Candidate School at Newport, R.I. Bill Hoffman is also taking the same course. Steve Chamberlin, when last heard from, was heading for Ft. Leonard Wood, Missouri, as a second lieutenant of engineers.

More data is available concerning occupational duties of various Technology men. Phil Bagley is at M.I.T. doing research work. Robert Goddu is employed as a research chemist in the analytical division of the Hercules Powder Company. Ernest Holzmann, who got his master's degree at Technology, joined the staff of the Shell Development Company at Emeryville, Calif. Andrew Kulin and Mrs. Kulin are now making their home in Pittsburgh, Pa., where Andy is employed by Westinghouse. The Midwestern Geophysical Laboratory at Tulsa, Okla., now has the services of Don O'Brien. Orlo Powell completed the six-week service training school of Hamilton Standard Division of United Aircraft at East Hartford, Conn. Orlo received assignment to new duties as a junior test engineer.

John Simons is connected with the Atomic Power Division of Westinghouse. The Chance-Vought Aircraft Division at Dallas, Texas, got the services of four Technology men; they are John Welch, Allan Shaw, Angus Bower, and Bill Stanfield. Du Pont's Experimental Station at Wilmington, Del., now has John Beasley doing research work for them.

And the first "blessed event" announcement which has arrived informs us that Dan and Nan Sully are the proud parents of a baby girl, christened Christine Ann. As for your correspondent, he is still tangling horns with the case system at the "B" school. By the way, they do keep us busy here. Letters, cards or telegrams concerning your activities will be most welcome. — STAN MARCEWICZ, *Secretary*, Morris D-34, Harvard Business School, Soldiers Field, Boston 63, Mass.



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Central Illinois Public Serv. Co. 2	
Cincinnati Gas & Electric Co.....	2
Cleveland Electric Illum. Co.	3
Connecticut Light & Power Co....	1
Dayton Power & Light Co.....	4
Delaware Power & Light Co.....	1
Duke Power Co.....	6
Electric Energy Inc.....	4
Florida Power & Light Co.....	2
Illinois Power Co.....	2
Kansas City Power & Light Co....	1
Long Island Lighting Co.....	2
Metropolitan Edison Co.....	3
N. Y. State Electric & Gas Co.....	2
Niagara Mohawk Power Corp. 5	
Pacific Gas & Electric Co.....	2
Philadelphia Electric Co.....	1
Public Service Elec. & Gas Co.....	3
Rochester Gas & Elec. Co.....	2
Rockland Light & Power Co.....	1
South Carolina Elec. & Gas Co....	2
Southern California Edison Co. 2	
Tennessee Valley Authority.....	4
Union Electric Co.....	2
Virginia Electric & Power Co.....	2
Wisconsin Electric Power Co.....	5

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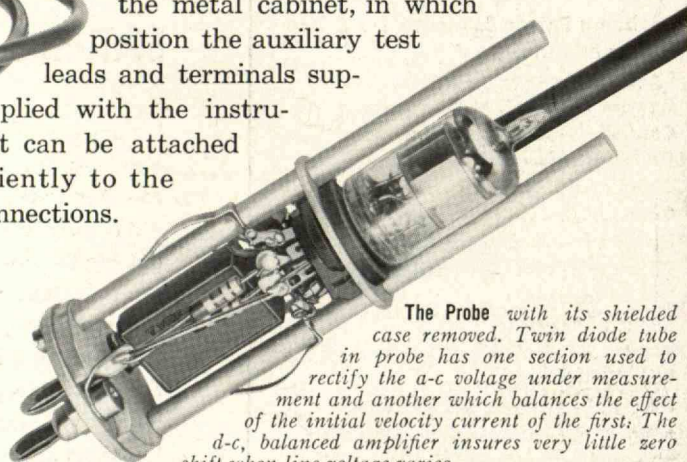
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